

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

DATA REPORT FOR THE PACE 1987 SEISMIC REFRACTION SURVEY,
WEST-CENTRAL ARIZONA

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OPEN-FILE REPORT 88-694

This report is preliminary and has not been reviewed for conformity with U. S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the U.S.G.S.

¹ U.S.G.S. Menlo Park, California

1988

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INTRODUCTION

In May 1987, the Pacific to Arizona Crustal Experiment (PACE), funded by the U. S. Geological Survey, conducted a seismic refraction survey across the Transition Zone between the Basin and Range Province (BRP) and Colorado Plateau in west-central Arizona. It was the second in a series of seismic refraction profiles which will eventually extend from northeastern Arizona to the Pacific Ocean off the coast of southern California. PACE was organized as a multidisciplinary geoscience transect to study a wide swath of the earth's crust in the southwestern United States, where many different geologic terranes are juxtaposed. The seismic refraction experiments are an essential part of this transect, providing constraints on crustal structure and composition at depth.

The first experiment, conducted in the spring of 1985, was centered in the Whipple Mountains in southeastern California (Wilson and Fuis, 1987; Figure 1a). This area is characterized by major crustal extension associated with the metamorphic core complex exposed in the Whipple Mountains. The 1987 experiment was designed to reveal the crustal structure of the BRP in western Arizona and the Transition Zone between the BRP and the Colorado Plateau to the northeast. Extreme extensional tectonics were dominant in the BRP during the Miocene, yet have had relatively little effect on the Colorado Plateau. An understanding of the transition between these two regions is therefore essential to unraveling the complex geologic history of the southwestern United States. This report is a compilation of the data obtained during the PACE 1987 seismic refraction experiment.

DESCRIPTION OF THE SURVEY

The seismic refraction profile was oriented NE-SW and extended from Quartzsite, AZ, 25 km east of the Colorado River, to Camp Wood, AZ, 150 km northwest of Phoenix (see Figures 1a and 1b). A total of 27 shots ranging in size from 500 to 6000 lbs (225 to 2715 kg) of high explosive were used in 6.5 to 8 in (16 to 20 cm) drillholes 100 to 230 ft (30 to 70 m) deep. The explosive (ammonium nitrate containing high pressure beads) was ignited with detonating cord, boosters and electrical blasting caps.

The profile was divided into two deployments, each 90 km long (see Figure 1b). The first (southwestern) deployment extended northeast from Quartzsite, AZ (Shotpoint 21) to Alamo Lake, AZ (Shotpoint 26). This line consisted of 13 shots, including 5 offset shots and 1 fan shot. The second (northeastern) deployment extended from Alamo Lake northeast to Camp Wood, AZ (Shotpoint 31). This line consisted of 14 shots, including 6 offset shots and 1 fan shot. Average seismic recorder spacing was 750 m. Locations of shotpoints and seismic recorder sites are listed in Tables 1 and 2, and plotted in Figure 1. Shot points 20, 21, 23, 26, 28, 31, 33 and 34 were each shot twice, once for each line, shot points 22, 24, 25, 35 and 37 were recorded for the first deployment only, and shot points 7, 27, 29, 30, 32 and 36 were recorded for the second deployment only.

INSTRUMENTATION AND DATA REDUCTION

Seismic Recorders

Field operations involved the deployment of 120 seismic recorders by six observers, each of whom was responsible for 20 instruments. The seismic recorders (Healy and others, 1982) are portable, weigh approximately 18 kg, are powered by two 6-volt rechargeable batteries and contain 30-

minute cassette tapes to record data. Packaged with each seismic recorder is a single vertical-component 2-Hz geophone, which is removed, oriented, and buried when the seismograph is deployed. Each recorder also includes a chronometer, three independent amplifiers with pre-set attenuation settings, a calibrator, a tape deck, and a tape-speed-compensation tone generator. Ten minutes prior to the expected seismic energy arrival time, a pre-programmed microprocessor in the seismic recorder performs a geophone release test, an amplification check, and a calibration sequence consisting of a sine wave with a frequency of 10 Hz and an amplification of 1, 10, 100 and 1000 mv. The velocity response curve for the system peaks at about 6 Hz, but is relatively flat between 2 and 20 Hz (Dawson and Stauber, 1986).

Observers are responsible for synchronizing the clock in the seismic recorders, pre-programming the microprocessors with up to ten distinct recording times, and establishing accurate site locations. For this experiment, recording locations were surveyed prior to the deployment of the recorders using 1:24,000 topographic sheets, color infrared aerial photos and 1:63,360 orthophoto quadrangle maps. Estimated accuracy of locations is ± 25 m.

After the shots have been fired, observers retrieve the seismic recorders, record chronometer drifts, and remove the cassette tapes.

Shot times are picked from a paper record made during the firing of each shot on which WWVB, the master clock time code, and the detonation pulse are recorded. Shot times are generally accurate to ± 2 msec.

Data Reduction

Information pertaining to the performance of the seismic recorders is summarized in the Field Data Tables (Appendix C). After checking the errors in time and site locations, the seismic signals from the cassette tapes were digitized for a total of 20 seconds at a rate of 200 samples/second. Digitizing begins at

$$t = t_s - 2.0 \text{ sec} + (x/6.0 \text{ km/sec})$$

where t_s is the shot time and x is the epicentral distance of the recorder from the shot. For long range shots, digitizing begins at

$$t = t_s - 4.0 \text{ sec} + (x/6.0 \text{ km/sec}).$$

Record sections of the data are displayed in Figures 4 - 57. Both trace normalized plots and range-scaled true amplitude plots are presented. The trace normalized record sections are plotted with maximum trace amplitudes normalized to a common value. The trace amplitudes of the range-scaled true amplitude plots were calculated using the formula

$$A_r = A_0 f_a f_d f_s$$

with

$$f_a = 10^{D/20}$$

$$f_d = (x/d_c)^r,$$

where, A_r is the range-scaled true amplitude, A_0 is the recorded amplitude, f_a is the instrument amplifier gain factor, f_d is the instrument offset factor, f_s is the shot efficiency factor, D is the instrument attenuation in decibels, x is the epicentral distance of the instrument from the shot, d_c is the attenuation cross-over distance and r is the attenuation exponent. d_c is not the cross-over distance between phases, but rather the point at which traces switch from negative to positive gain. It should

be noted that the factors used in plotting the record sections in this report were chosen to best display each individual record section. A more consistent use of these amplitude parameters would be required to quantitatively compare the amplitude characteristics from shot to shot. The amplitude parameters used in this report are listed in Appendix E. All record sections are plotted using a reduction velocity of 6.0 km/sec.

Archive Tape

Data included in this report is available on SEGY-format tapes recorded at 1600 BPI (Appendix D) from the following:

National Geophysical Data Center
NOAA/EGCI
325 Broadway
Boulder, CO 80303
Telephone: (303) 497-6123

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- Reynolds, S. J. (Compiler), 1980, Geologic Framework of West-Central Arizona (scale ~ 1:600,000): *Arizona Geological Society Digest*, v. XII.
- Wilson, E. D., Moore, R. T., and Cooper, J. R., 1969, Geologic Map of Arizona: U. S. Geological Survey Map (scale 1:500,000).
- Wilson, J. M., and Fuis, G. S., 1987, Data Report for the Chemehuevi, Vidal, and Dutch Flat Lines: PACE Seismic Refraction Survey, Southeastern California, and Western Arizona: U. S. Geological Survey Open-File Report 87-86.

36°00' 115°30'

111°00'

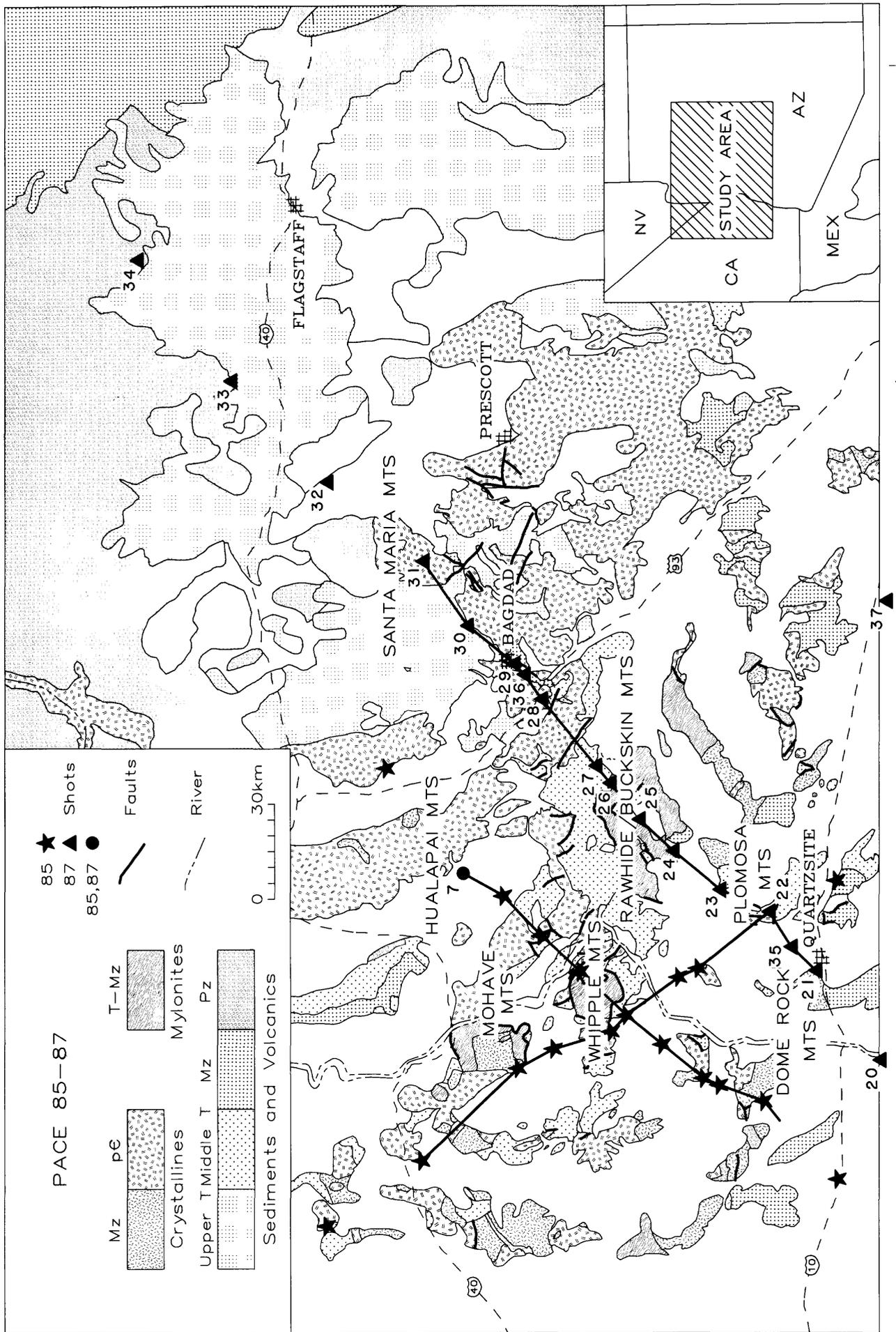


Figure 1a. Location figure showing both PACE 1985 and 1987 experiments and the general geology of the region.

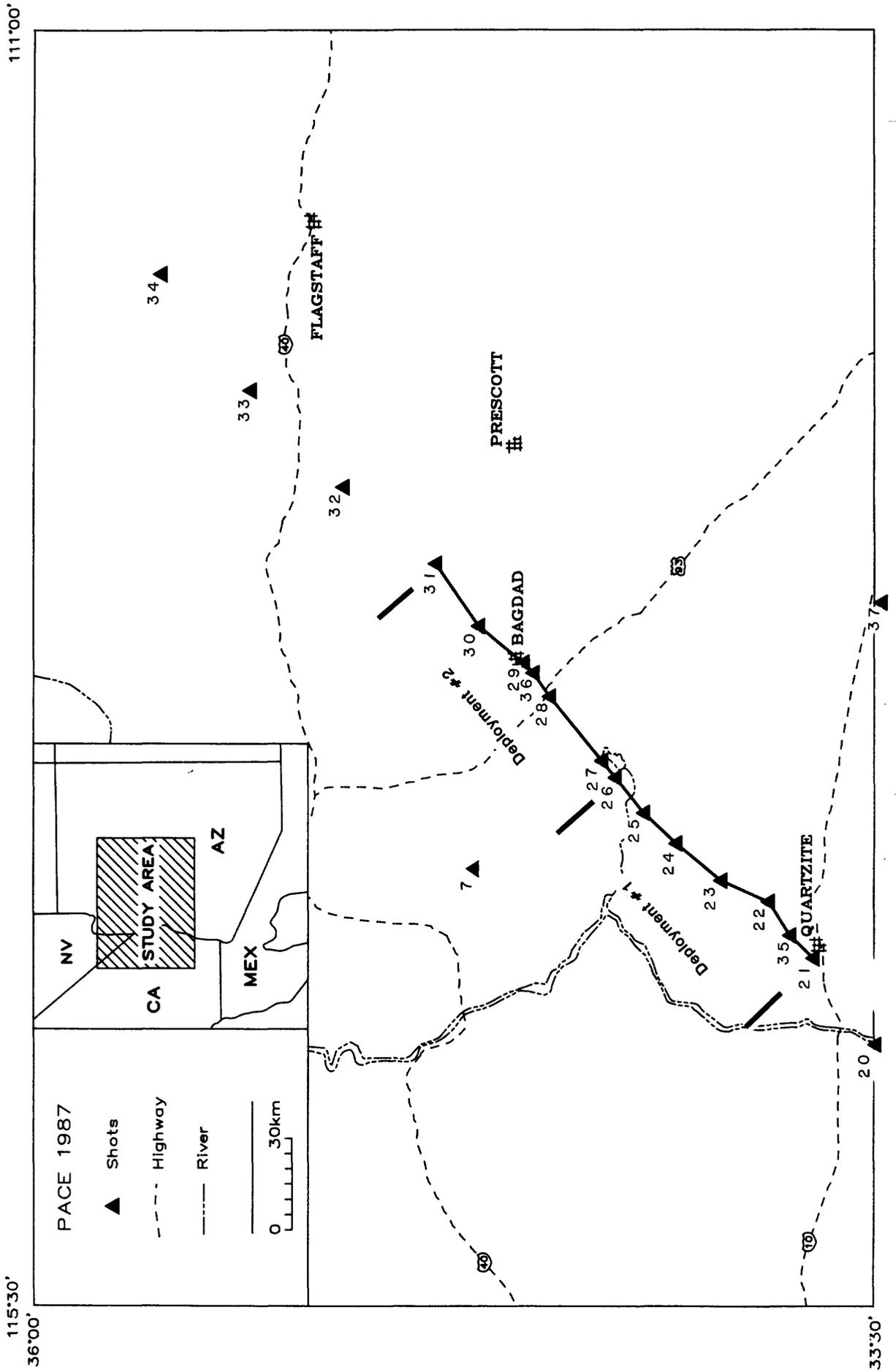
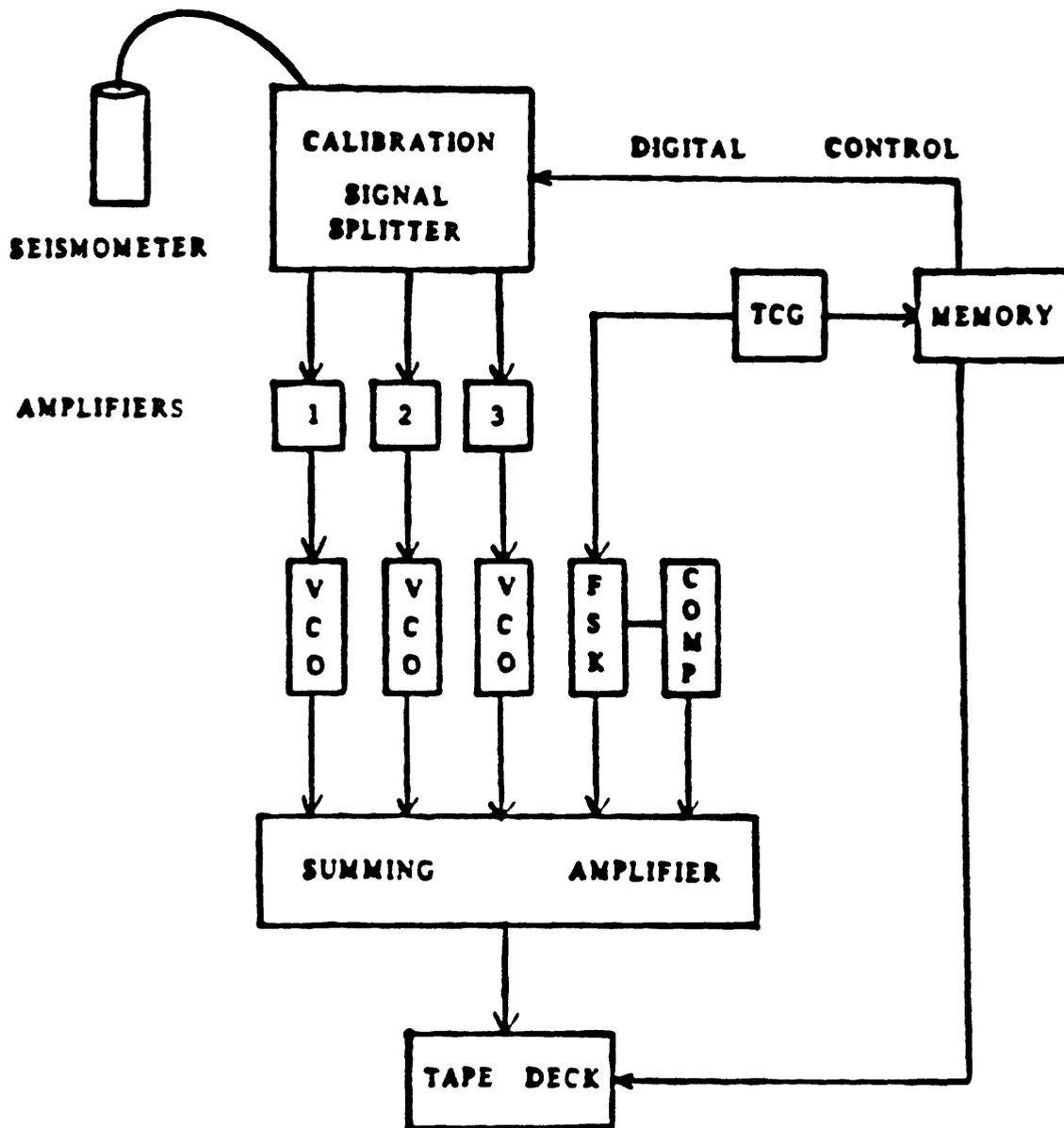


Figure 1b. Location figure showing the PACE 1987 experiment.



- COMP = TAPE SPEED TONE GENERATOR
- FSK = FREQUENCY SHIFT KEYING
- TCG = TIME CODE GENERATOR
- VCO = VOLTAGE-CONTROLLED OSCILLATOR

Figure 2. Schematic diagram of USGS seismic cassette recorders (from Healy et al., 1982, Figure 13).

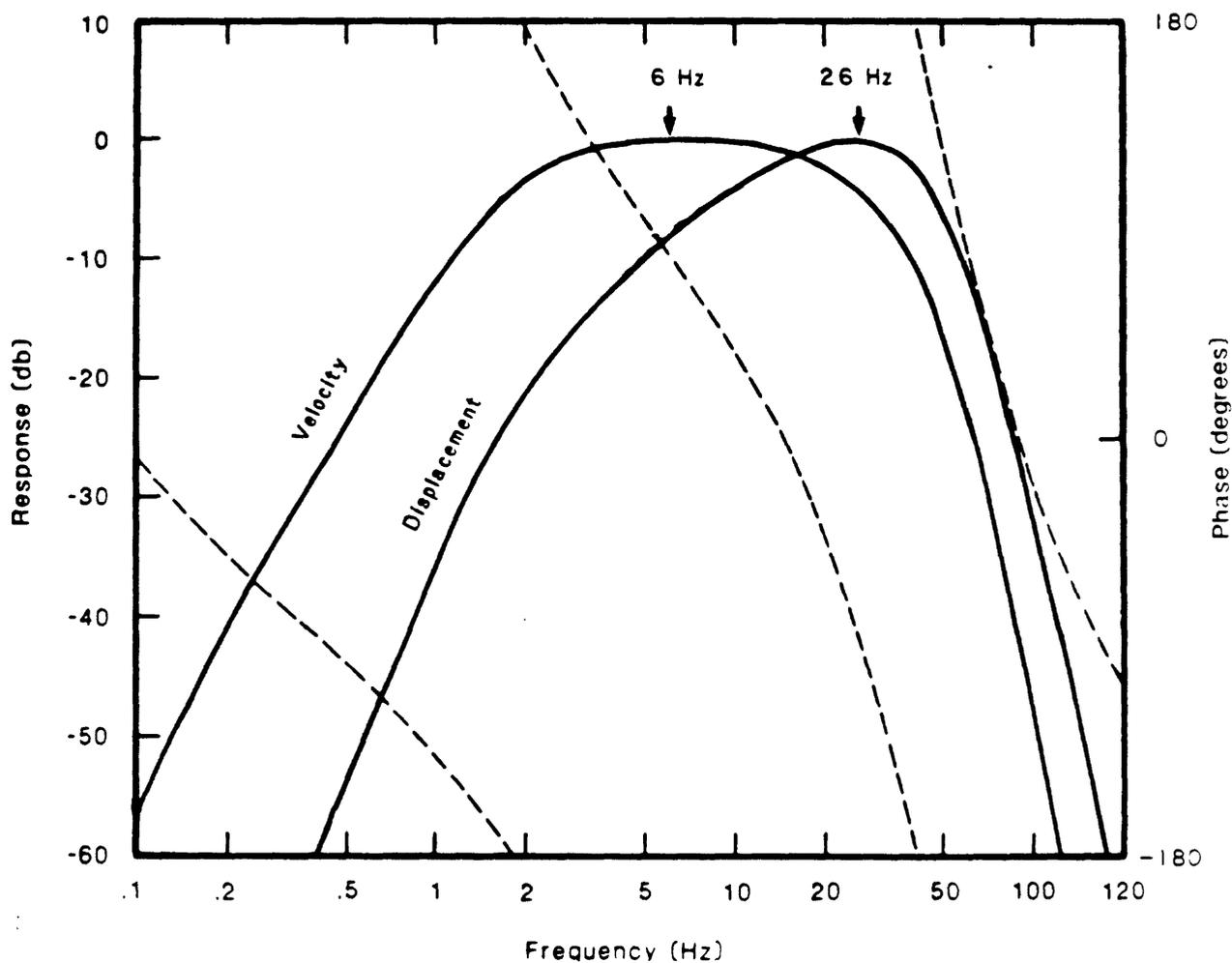
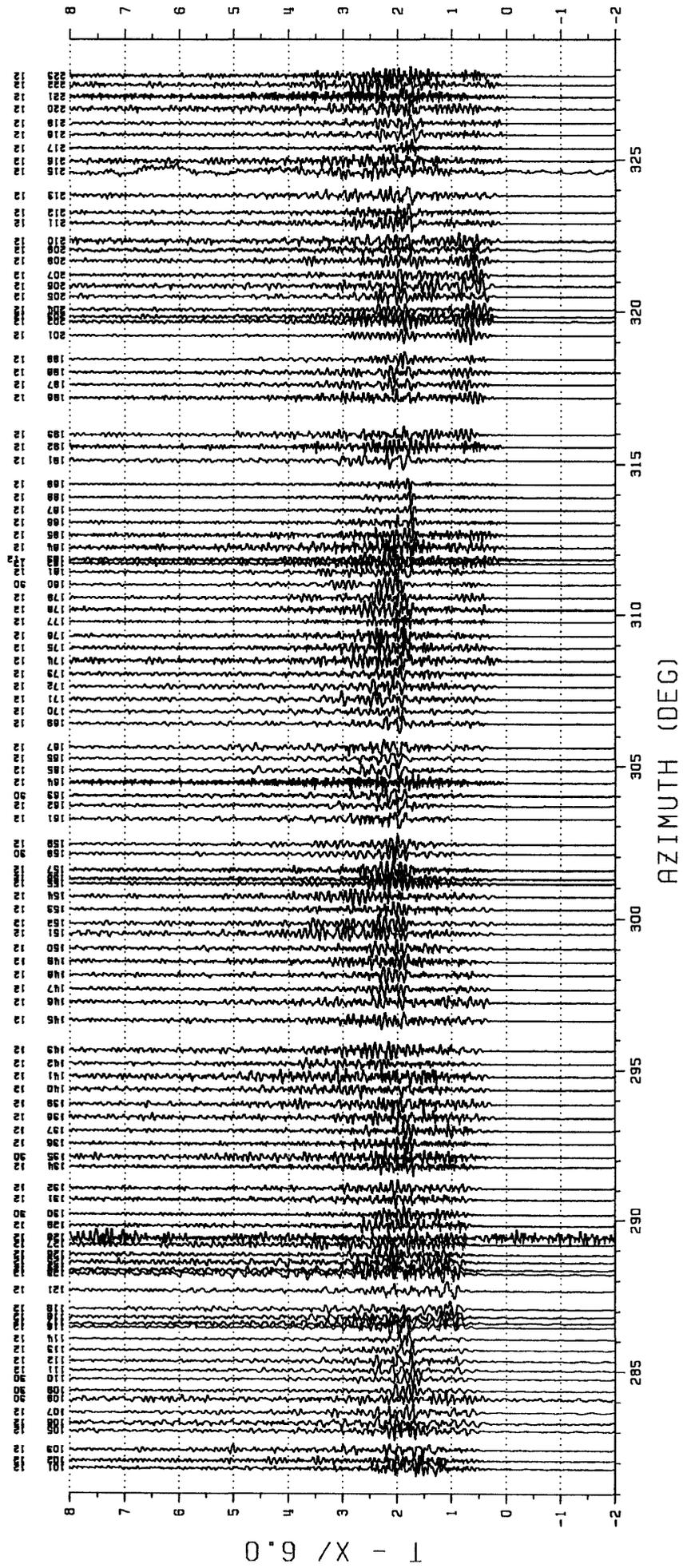


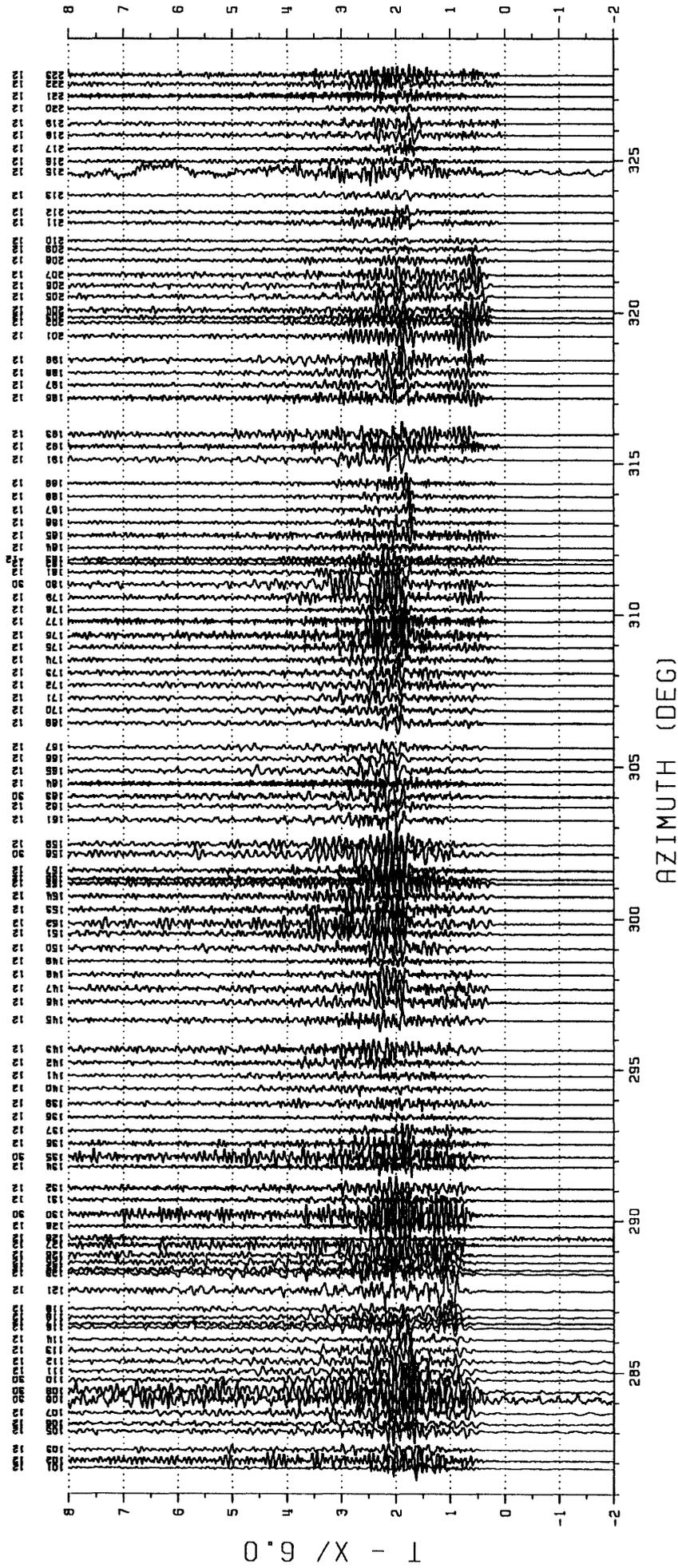
Figure 3. Theoretical transfer-function curves for the USGS short-period seismic refraction system. Solid line: displacement and velocity normalized amplitude; dashed line: phase (displacement). Maximum velocity response is at 6 Hz; maximum displacement response is at 26 Hz (from Dawson and Stauber, 1986, Figure 3).



Shot 1, Shotpoint 37

Normalized

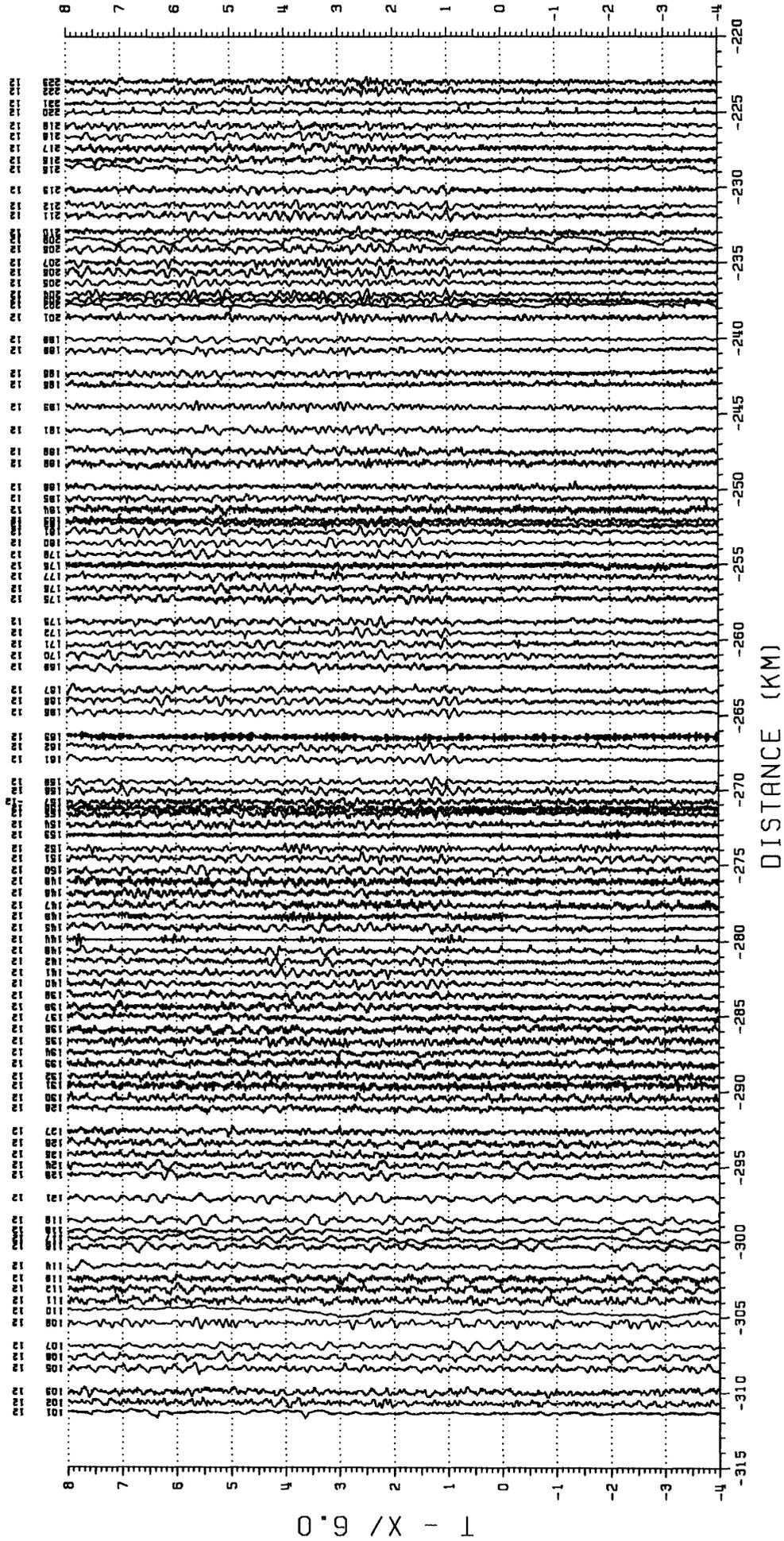
Figure 4



Shot 1, Shotpoint 37

True Amplitude

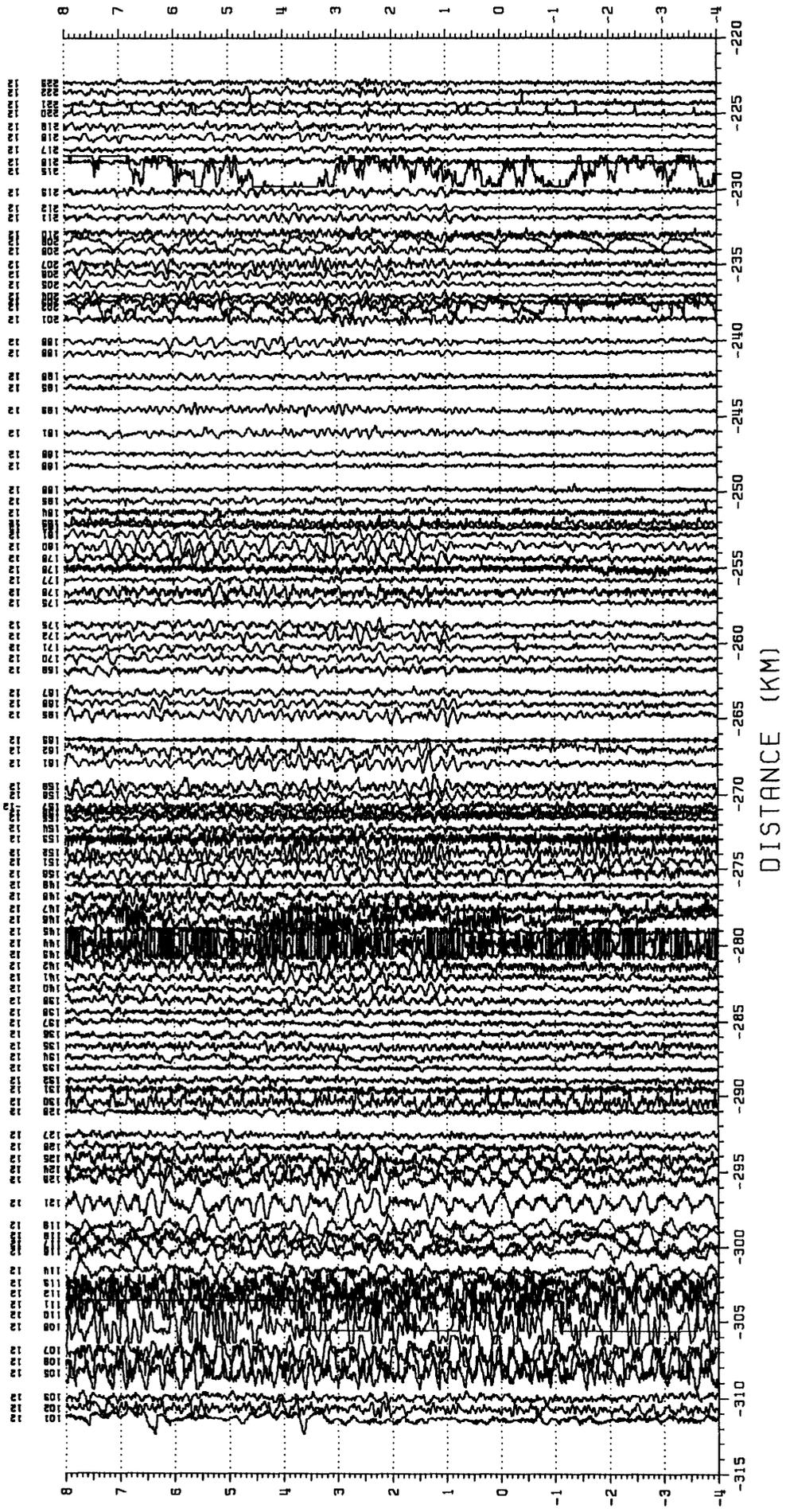
Figure 5



Shot 2, Shotpoint 34

Normalized

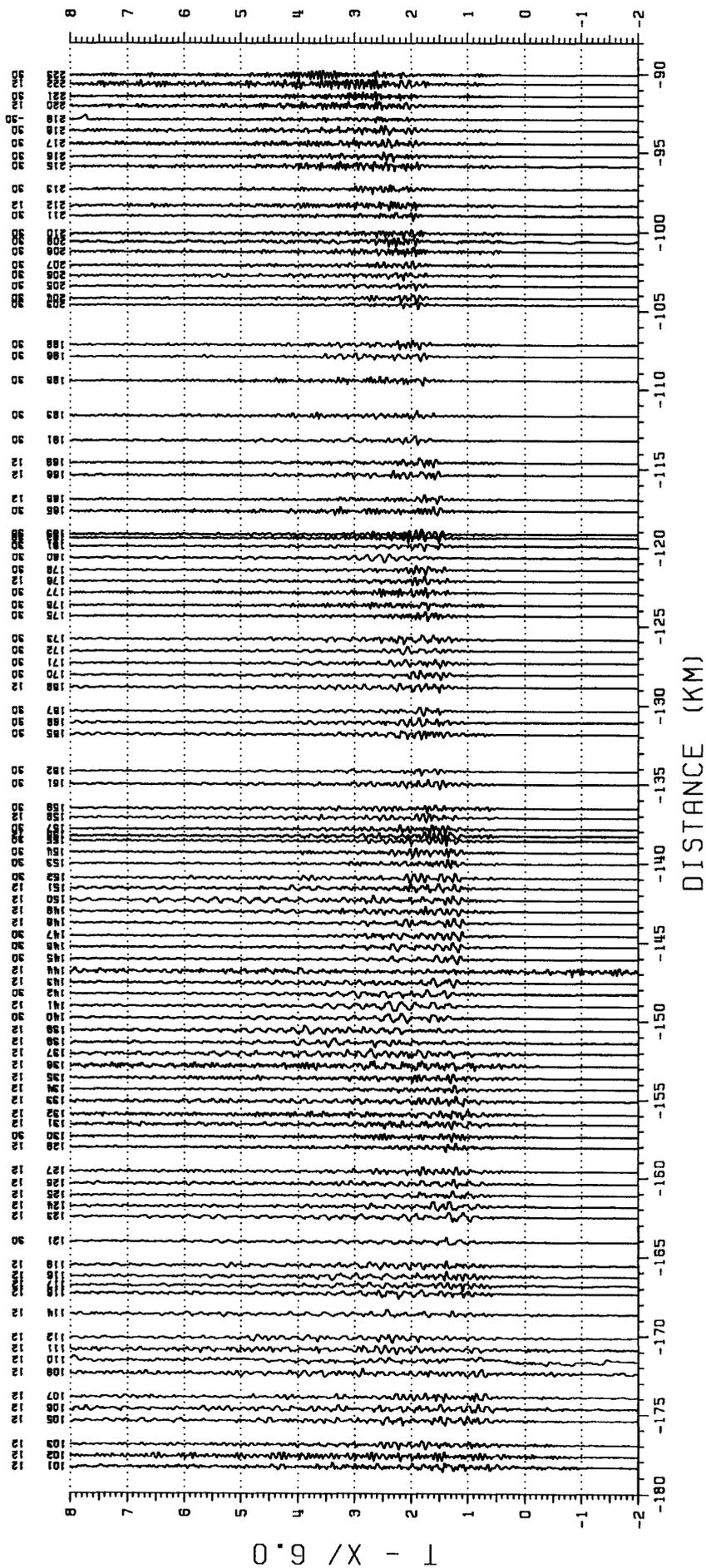
Figure 6



Shot 2, Shotpoint 34

True Amplitude

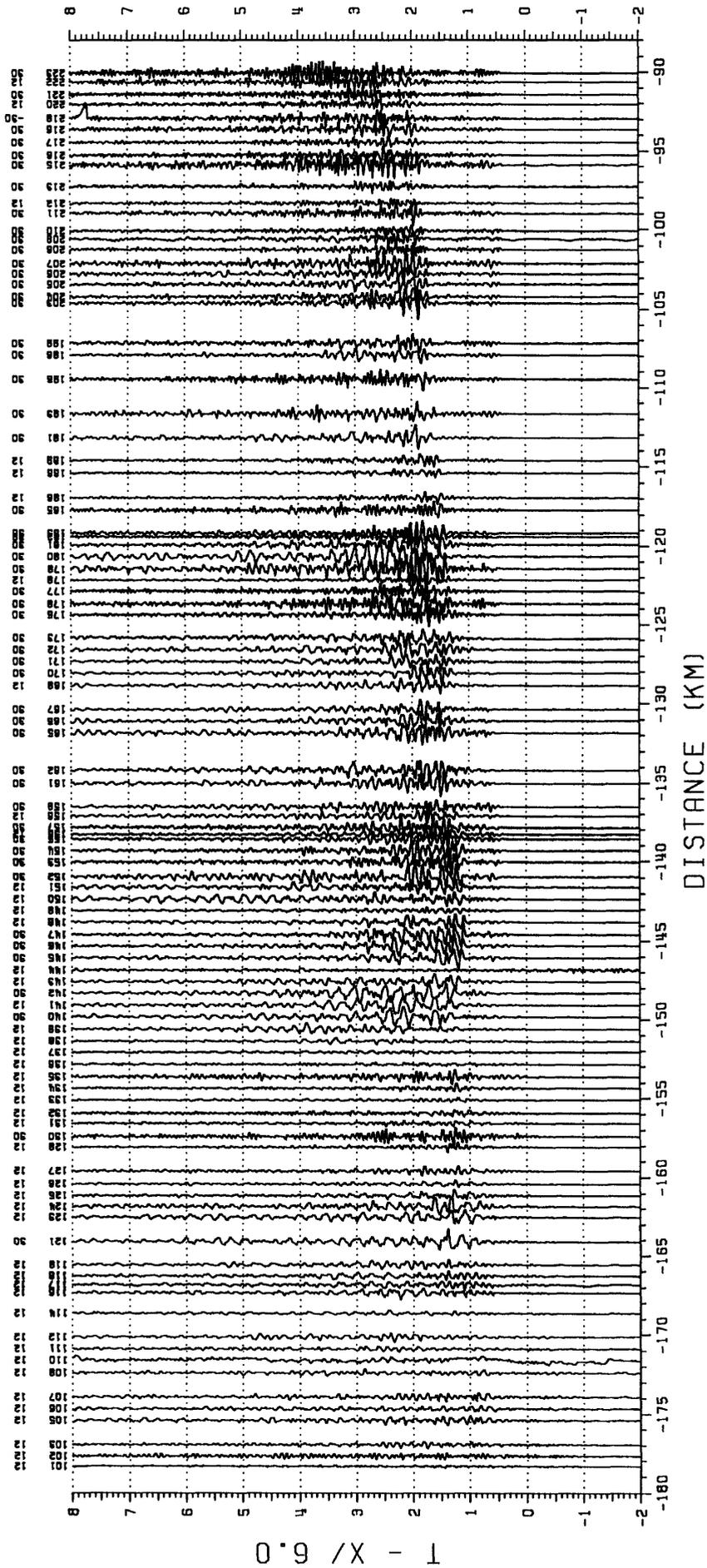
Figure 7



Shot 3, Shotpoint 31

Normalized

Figure 8

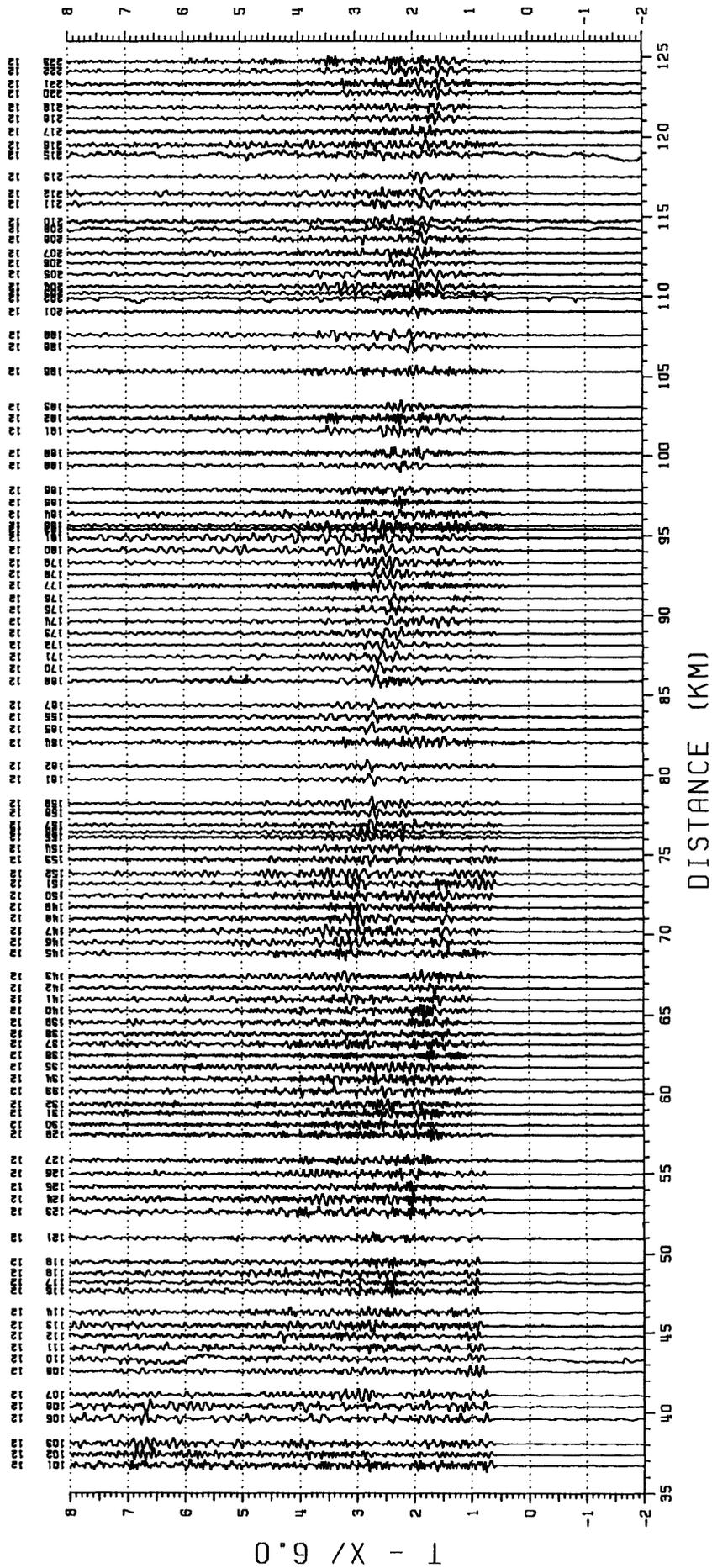


Shot 3, Shotpoint 31

True Amplitude

Figure 9

1 - X / 6.0

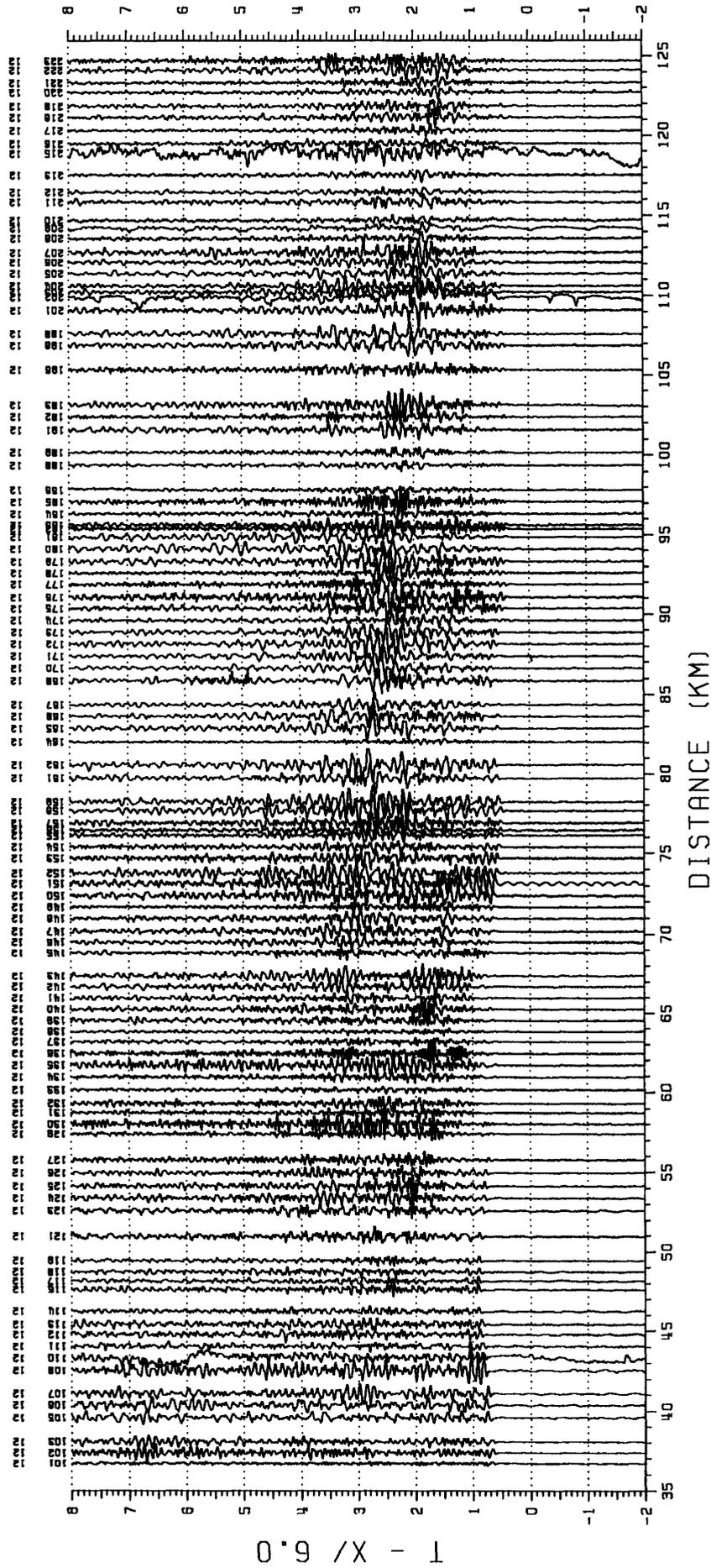


Shot 4, Shotpoint 20

Normalized

Figure 10

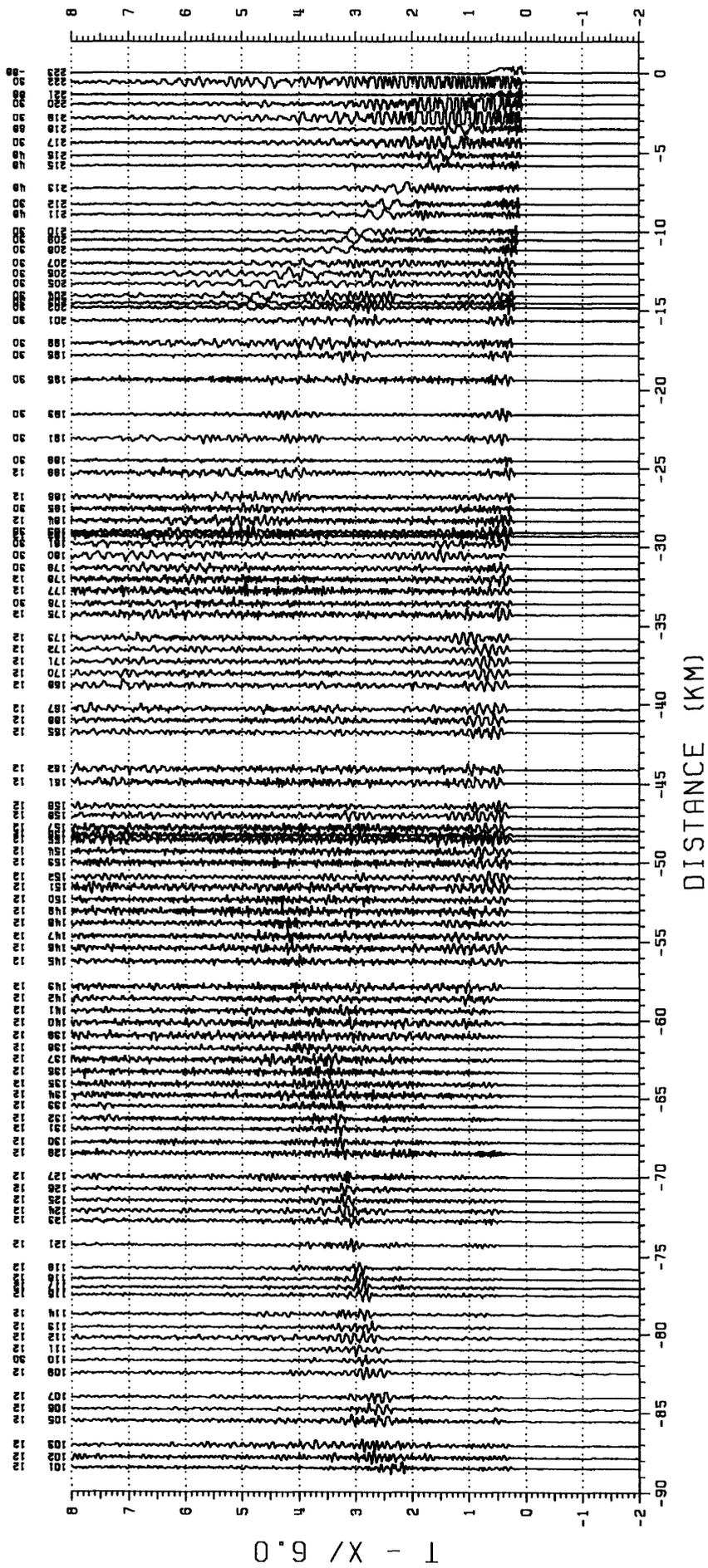
1 - X / 0.9



Shot 4, Shotpoint 20

True Amplitude

Figure 11

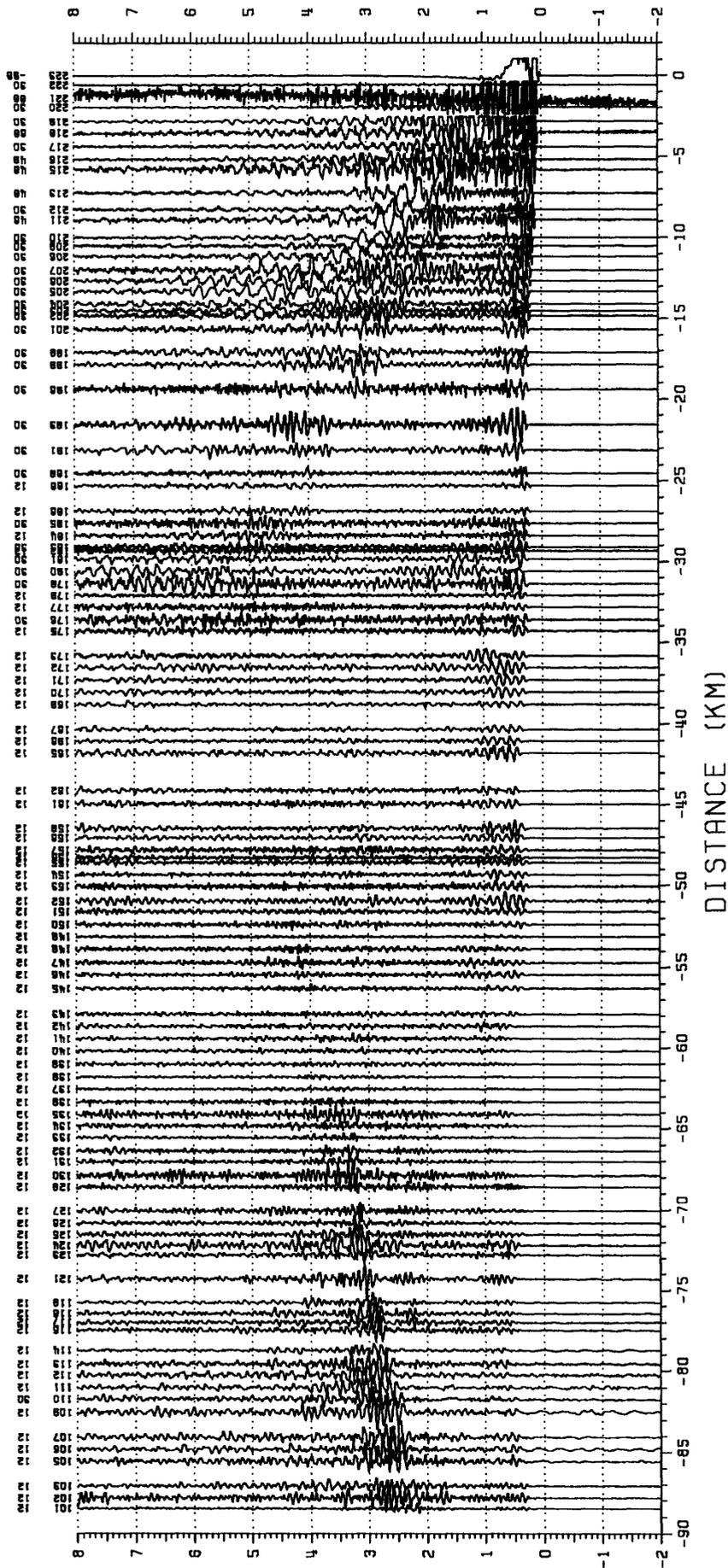


Shot 5, Shotpoint 26

Normalized

Figure 12

1 - X / 6.0

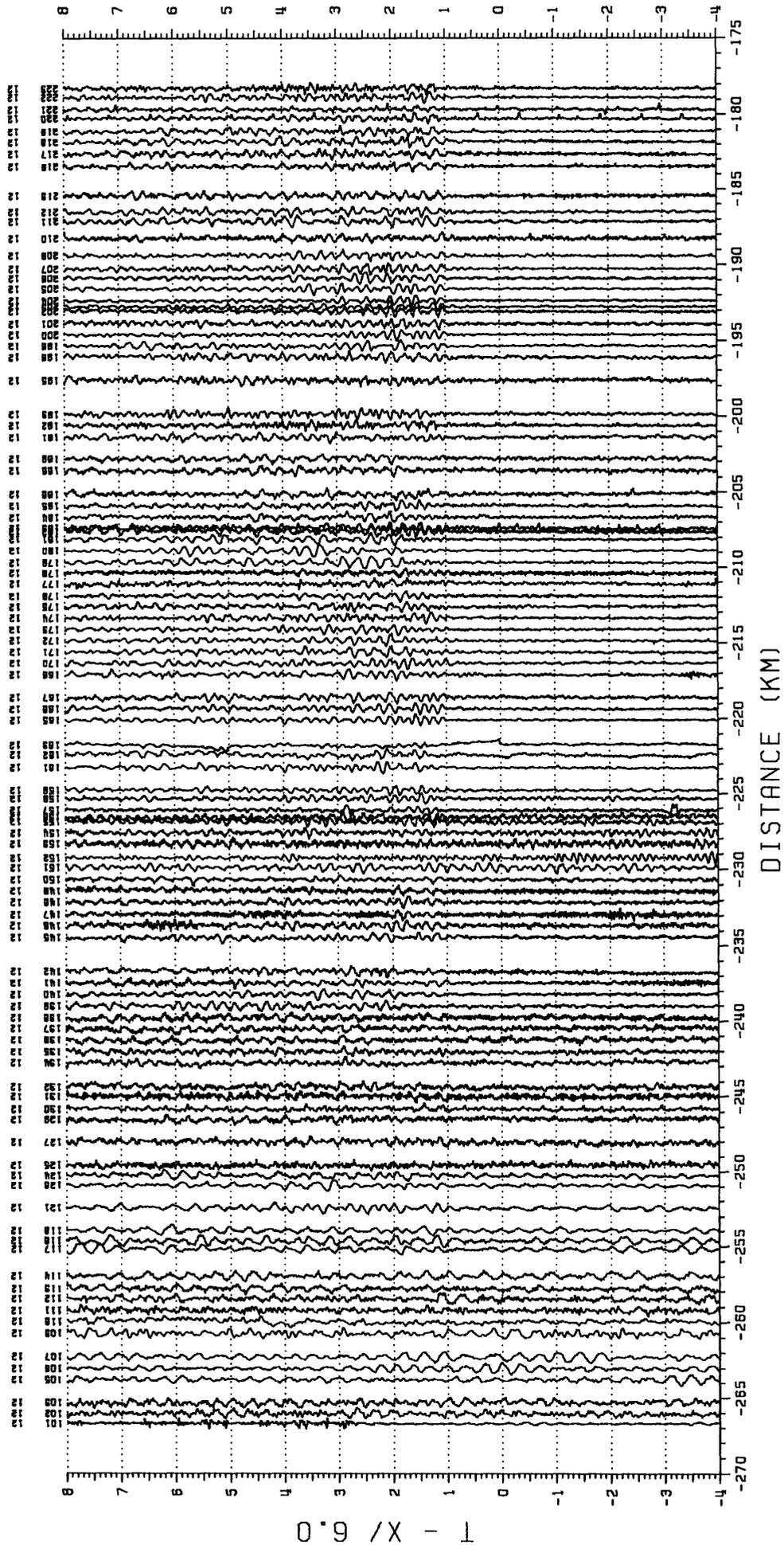


Shot 5, Shotpoint 26

True Amplitude

Figure 13

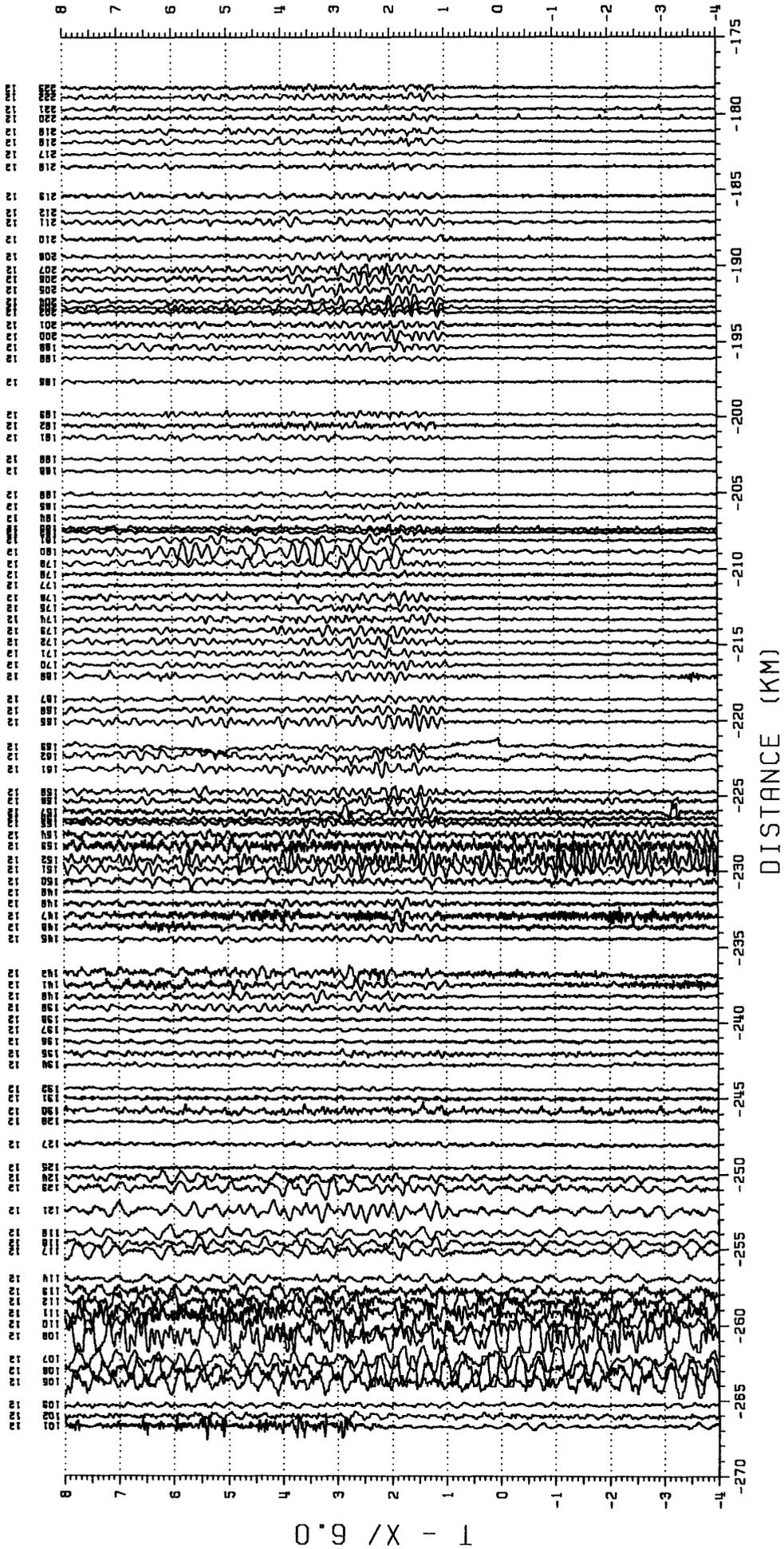
1 - X / 0.9



Shot 6, Shotpoint 33

Normalized

Figure 14

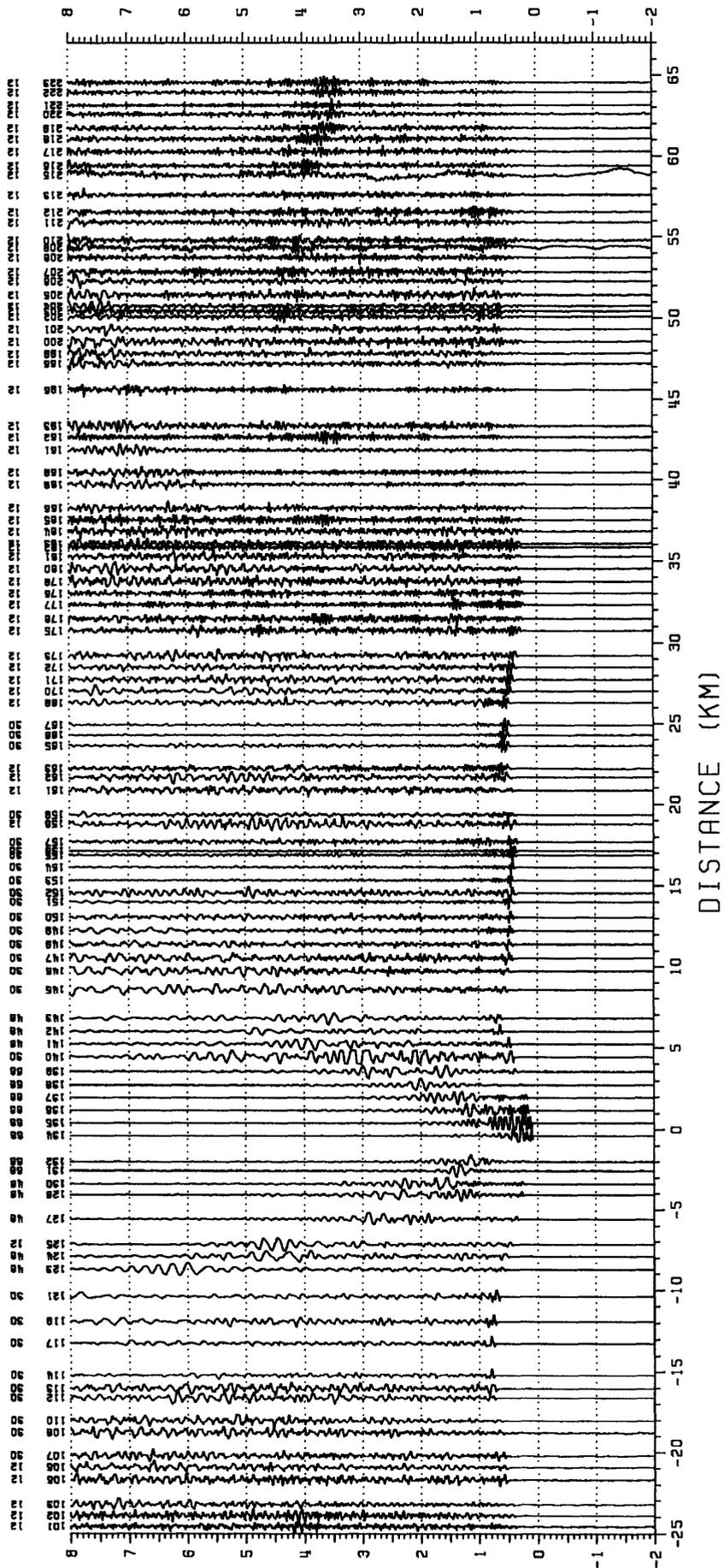


Shot 6, Shotpoint 33

True Amplitude

Figure 15

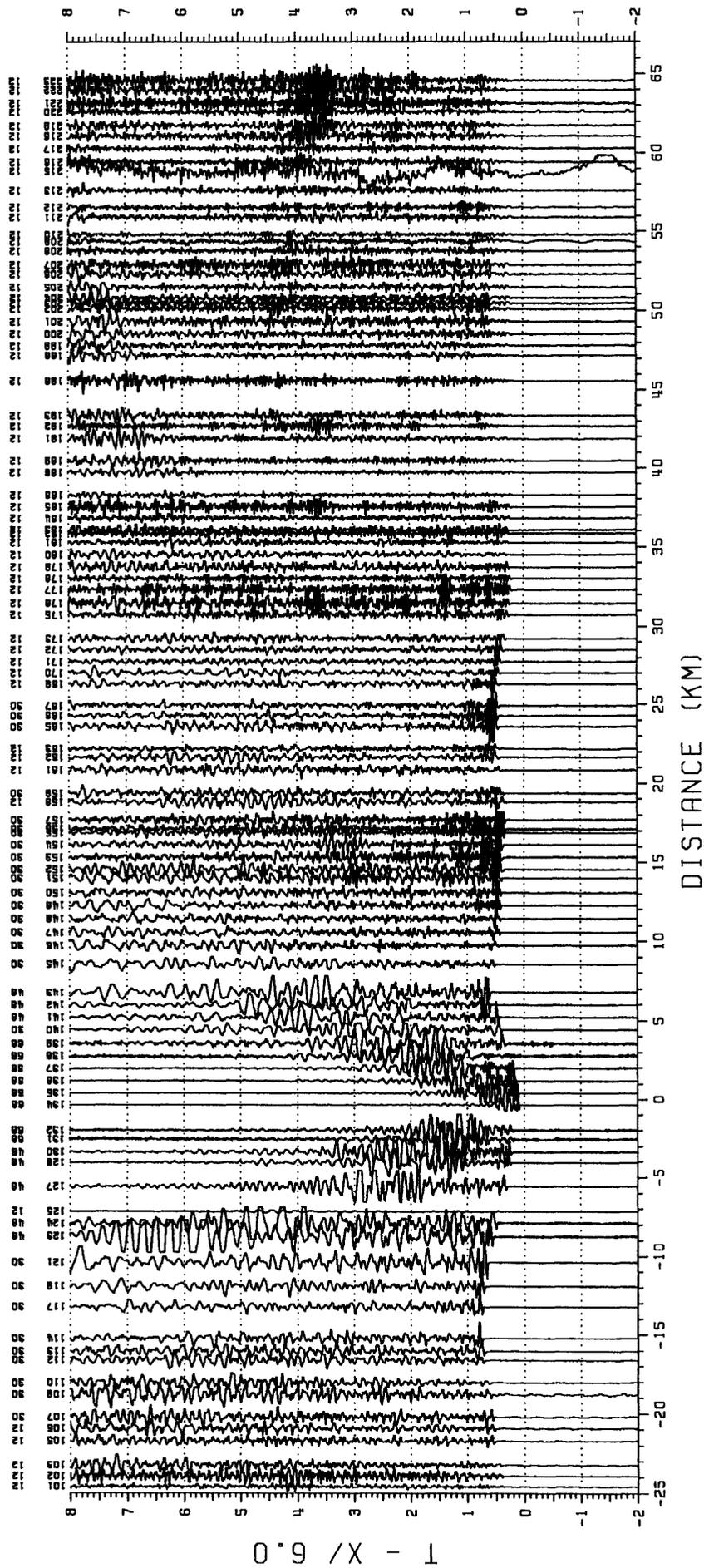
1 - X / 6.0



Shot 7, Shotpoint 22

Normalized

Figure 16

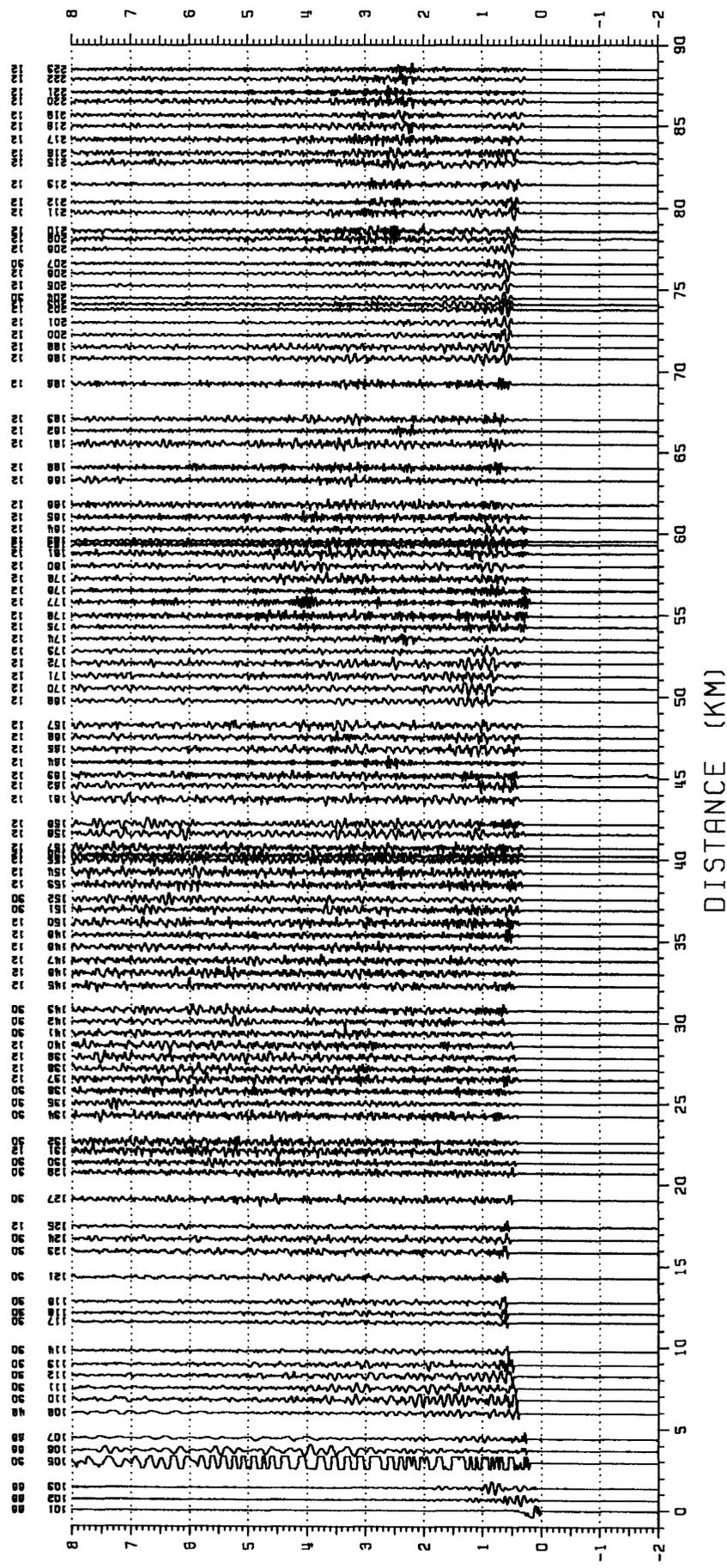


Shot 7, Shotpoint 22

True Amplitude

Figure 17

0.9 / X - 1

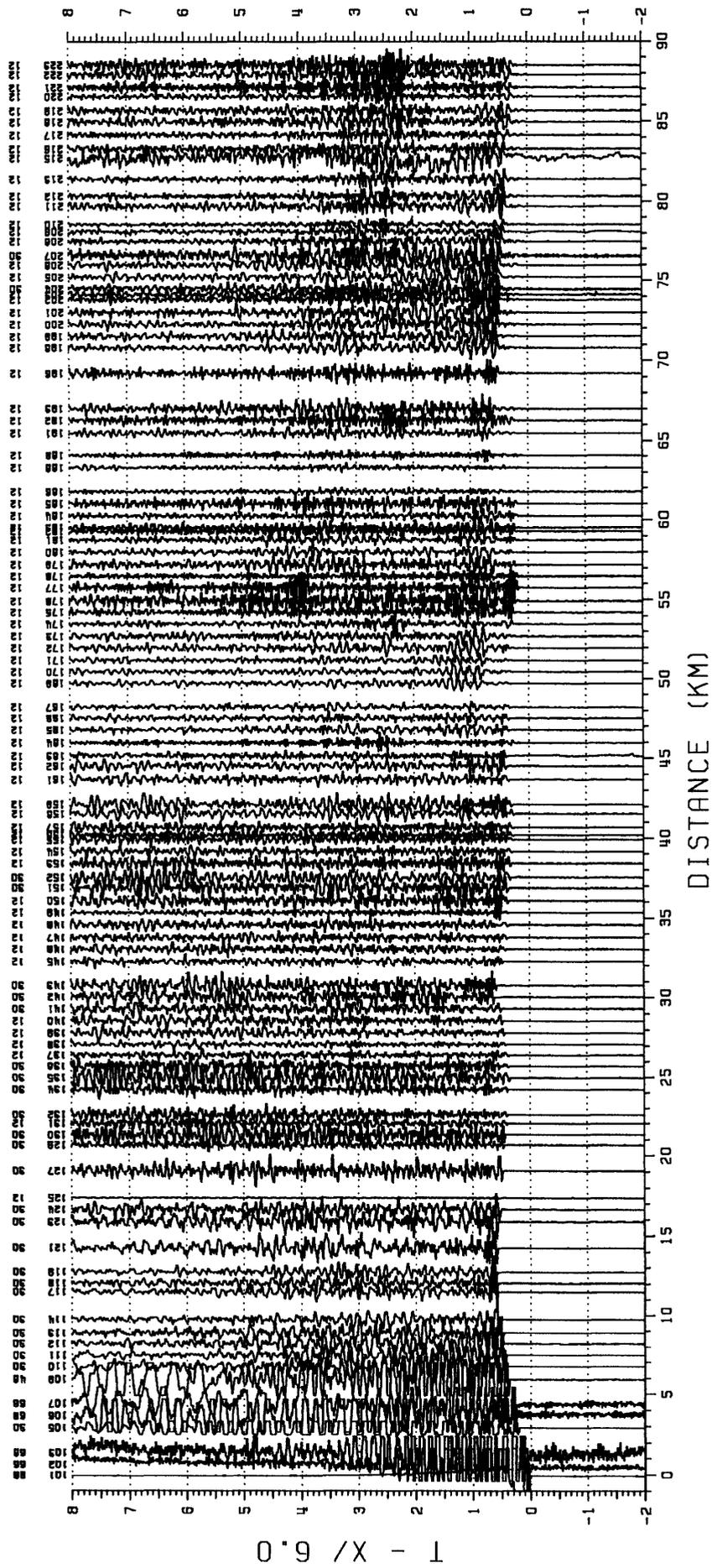


Shot 8, Shotpoint 21

Normalized

Figure 18

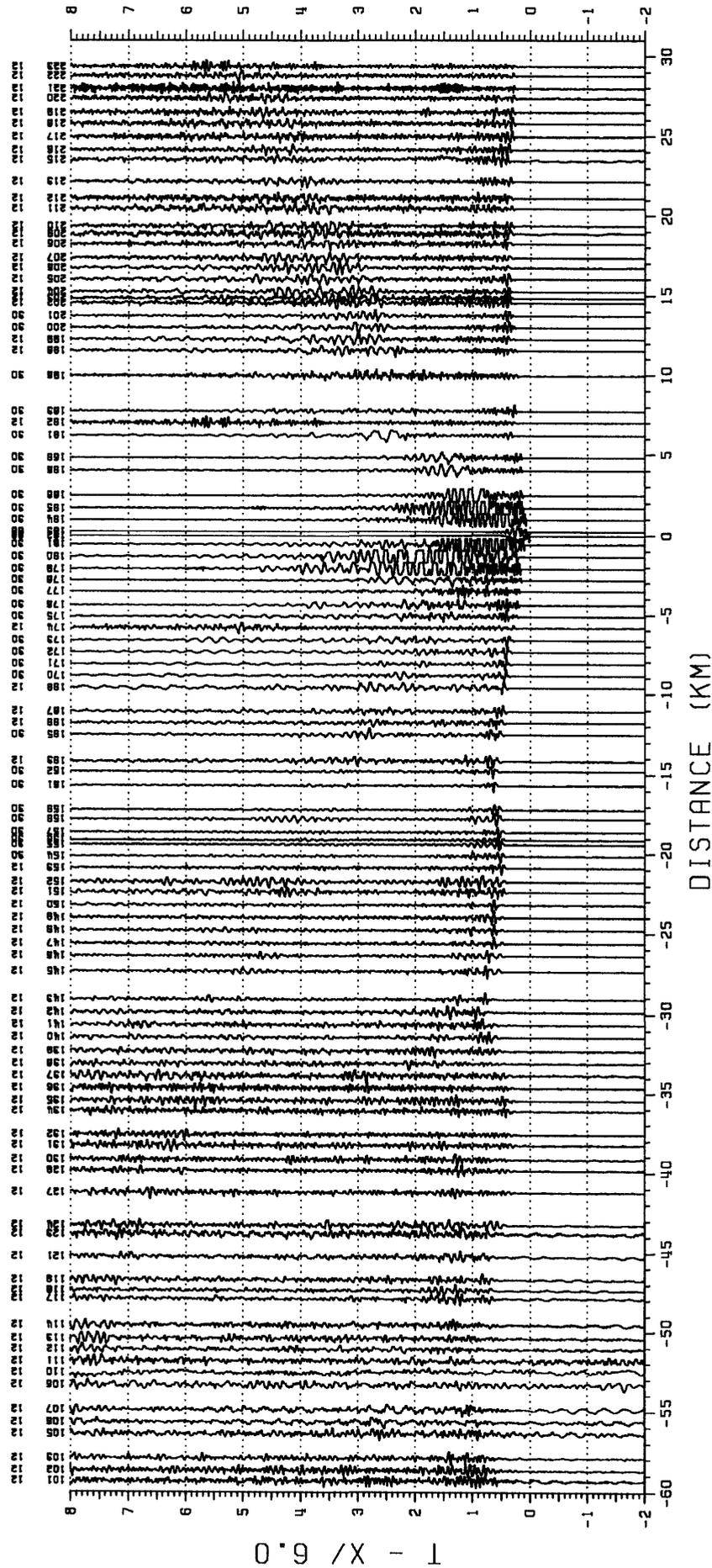
I - X / 6.0



Shot 8, Shotpoint 21

True Amplitude

Figure 19

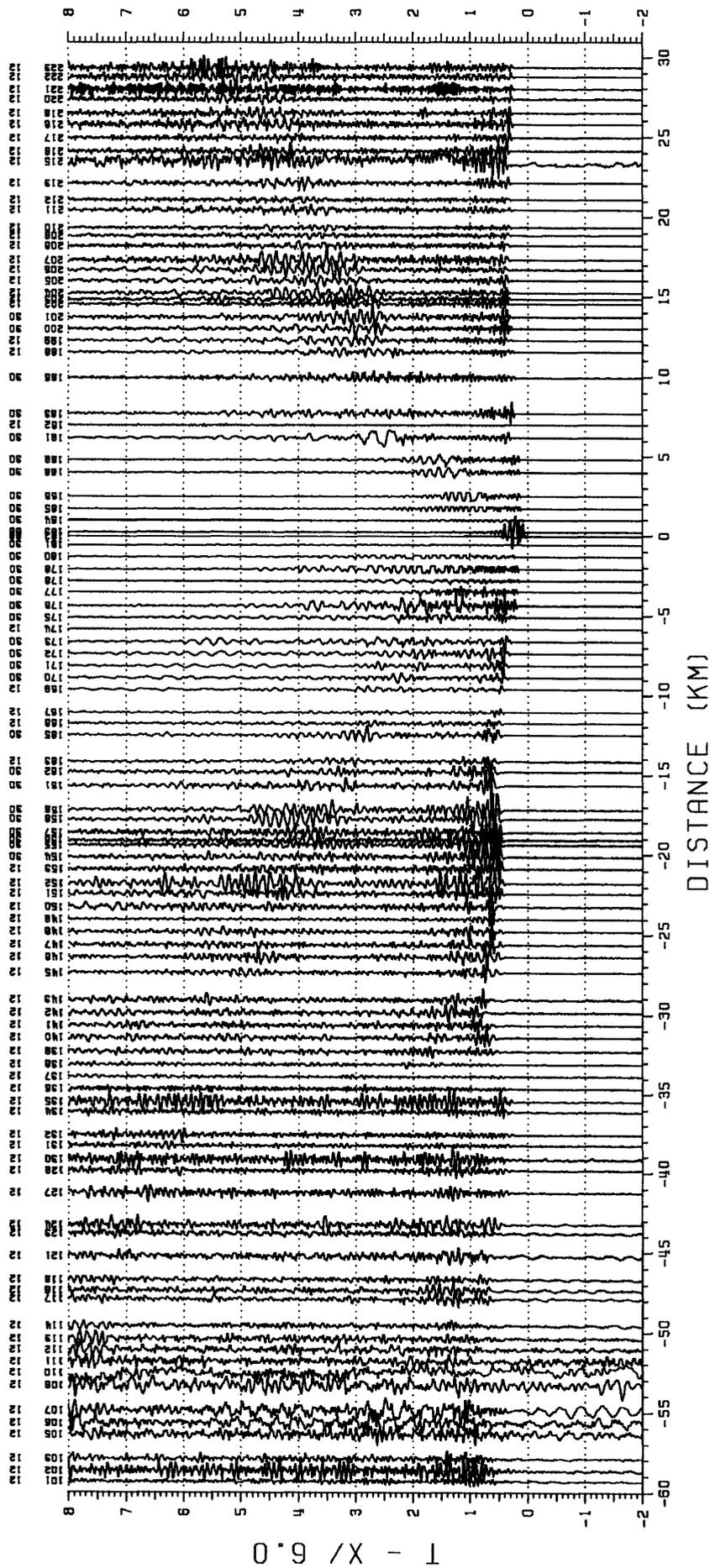


Shot 9, Shotpoint 24

Normalized

Figure 20

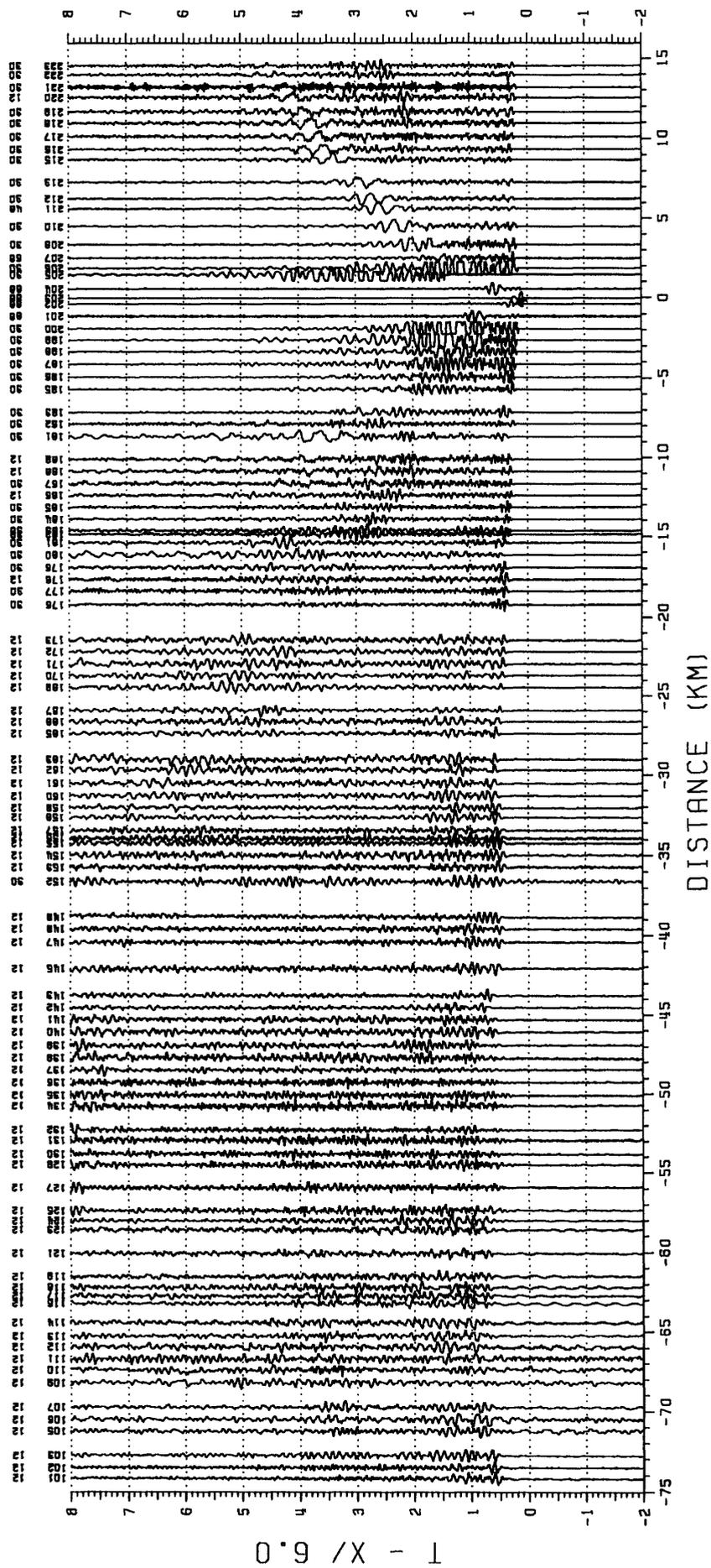
1 - X / 6.0



Shot 9, Shotpoint 24

True Amplitude

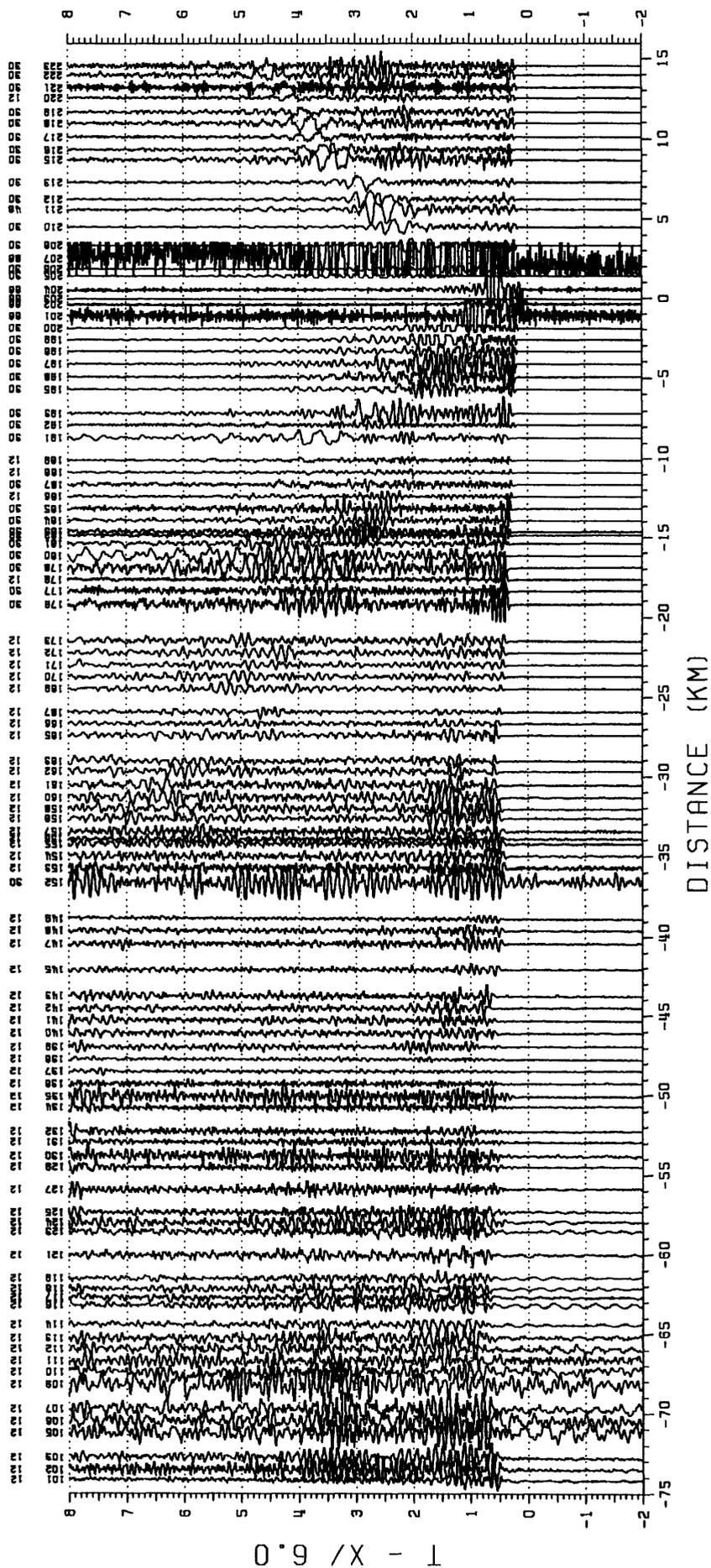
Figure 21



Shot 10, Shotpoint 25

Normalized

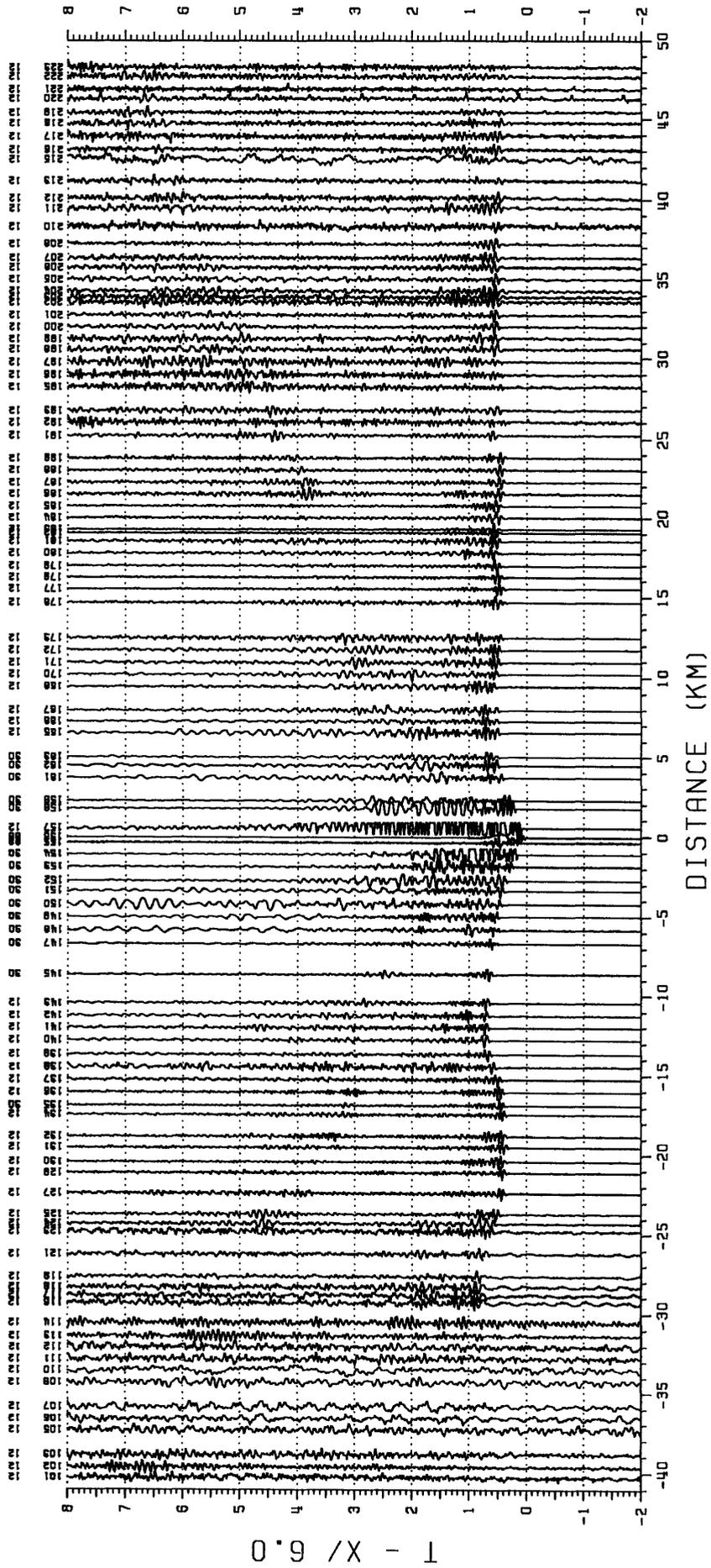
Figure 22



Shot 10, Shotpoint 25

True Amplitude

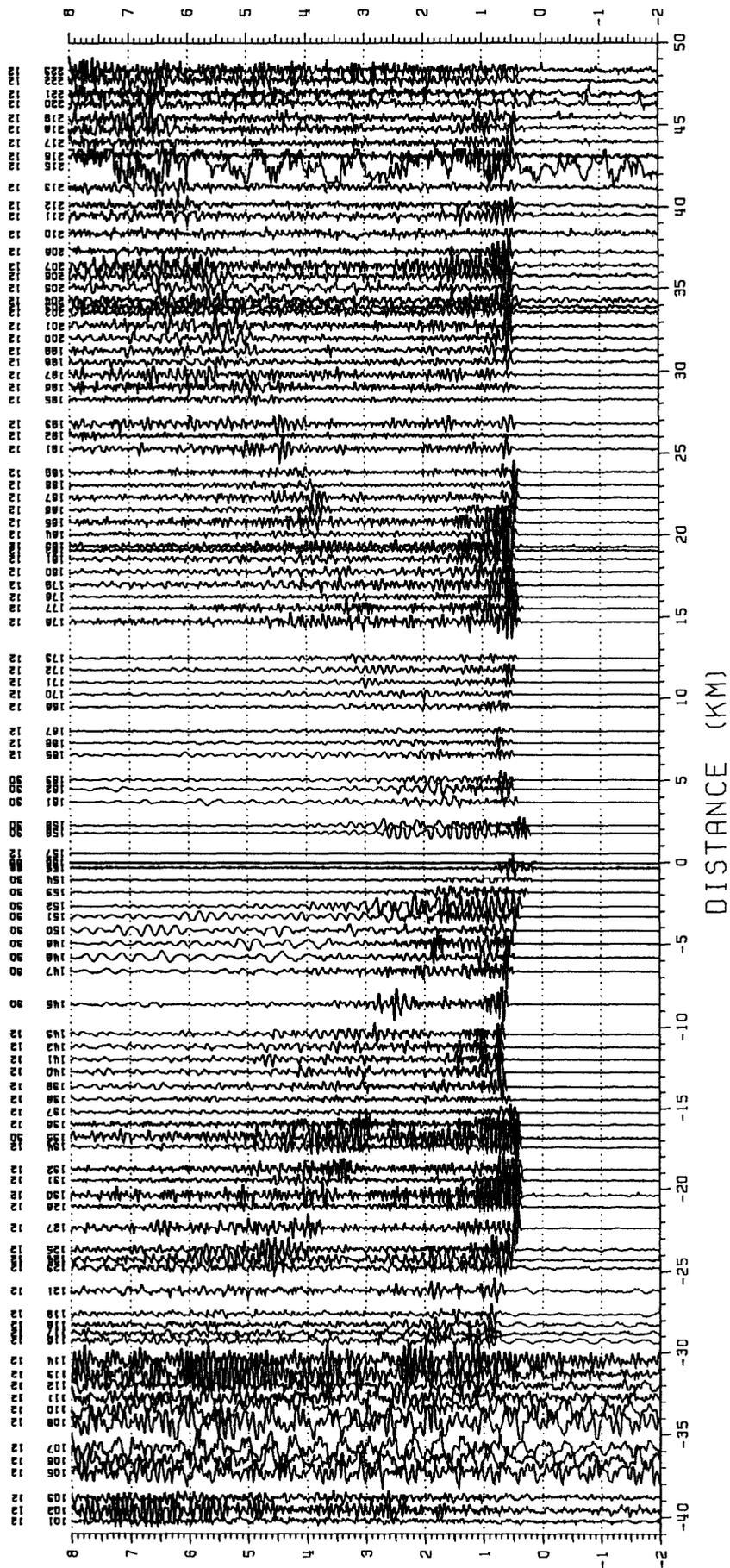
Figure 23



Shot 11, Shotpoint 23

Normalized

Figure 24

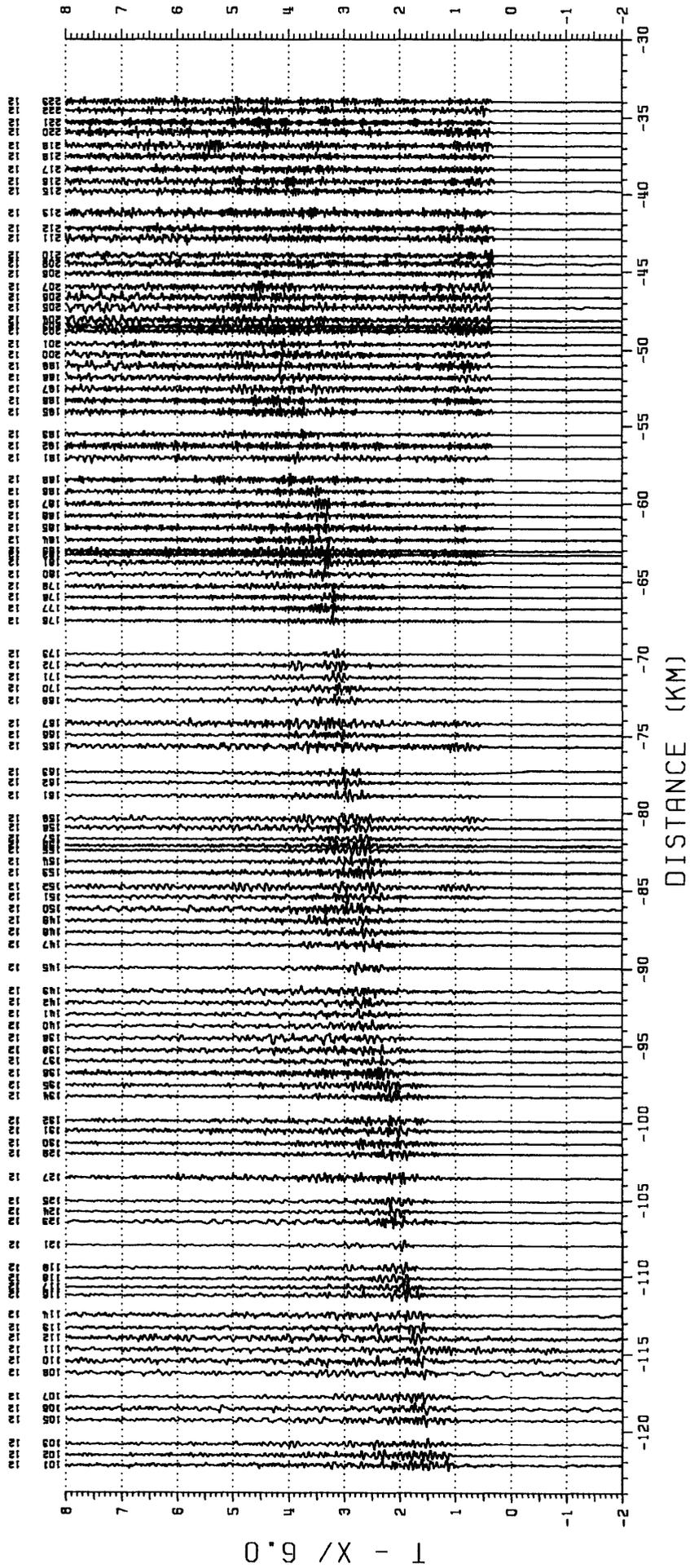


Shot 11, Shotpoint 23

True Amplitude

Figure 25

1 - X / 6.0

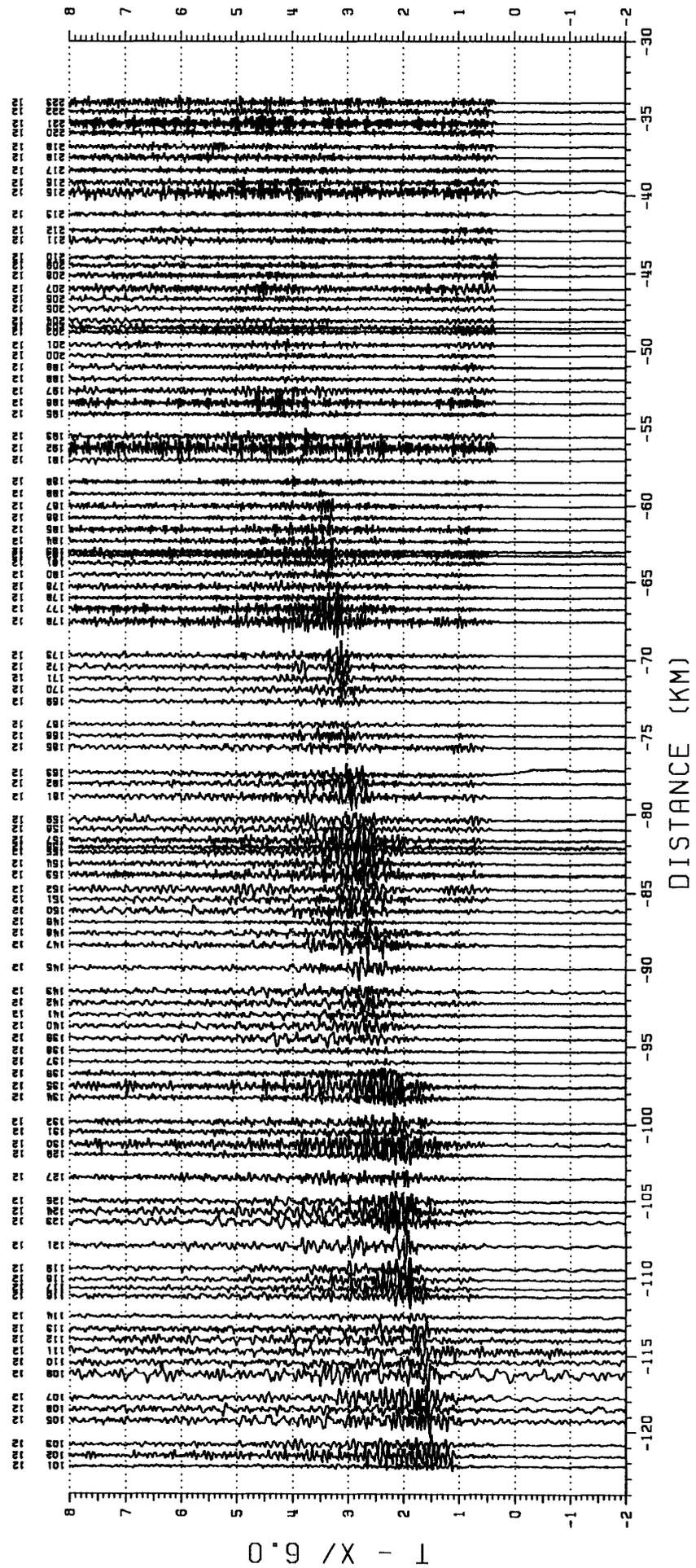


Shot 12, Shotpoint 28

Normalized

Figure 26

T - X / 6.0

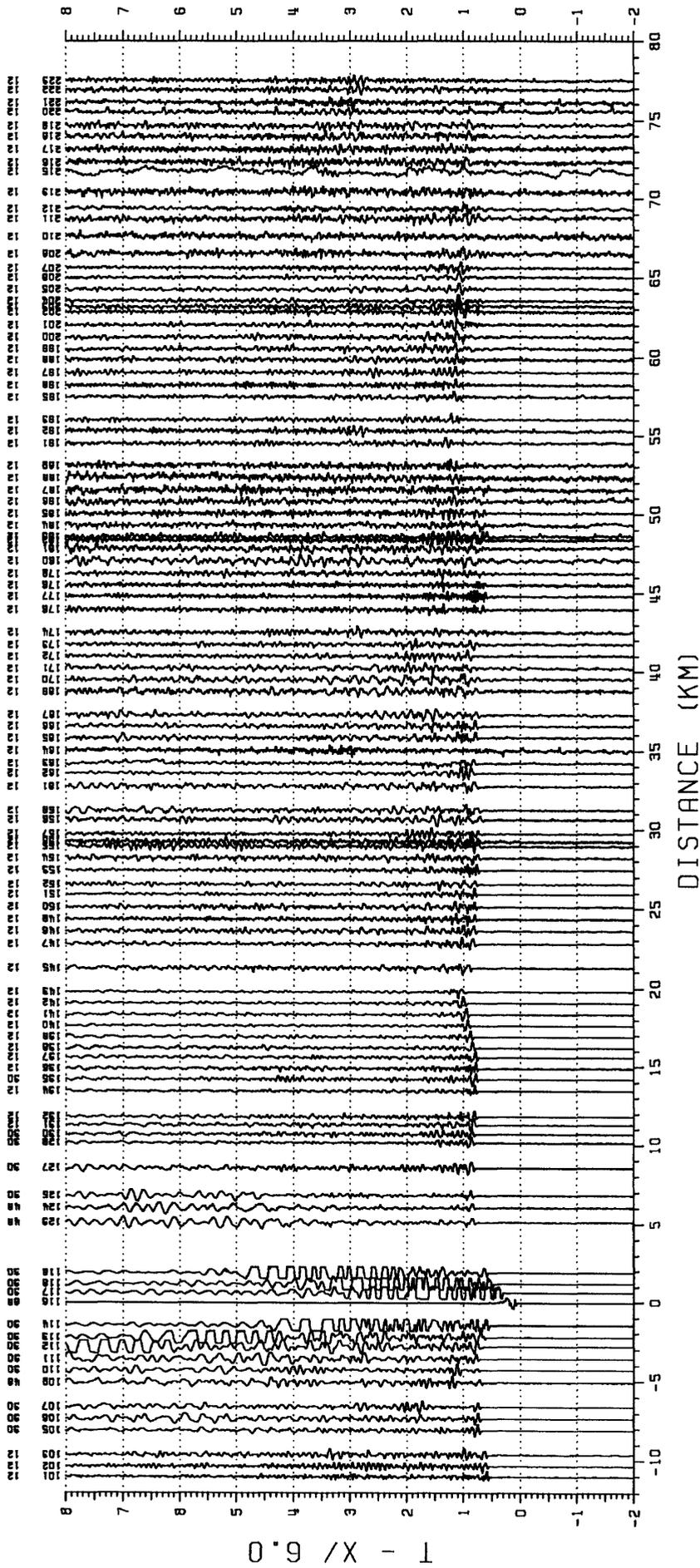


Shot 12, Shotpoint 28

True Amplitude

Figure 27

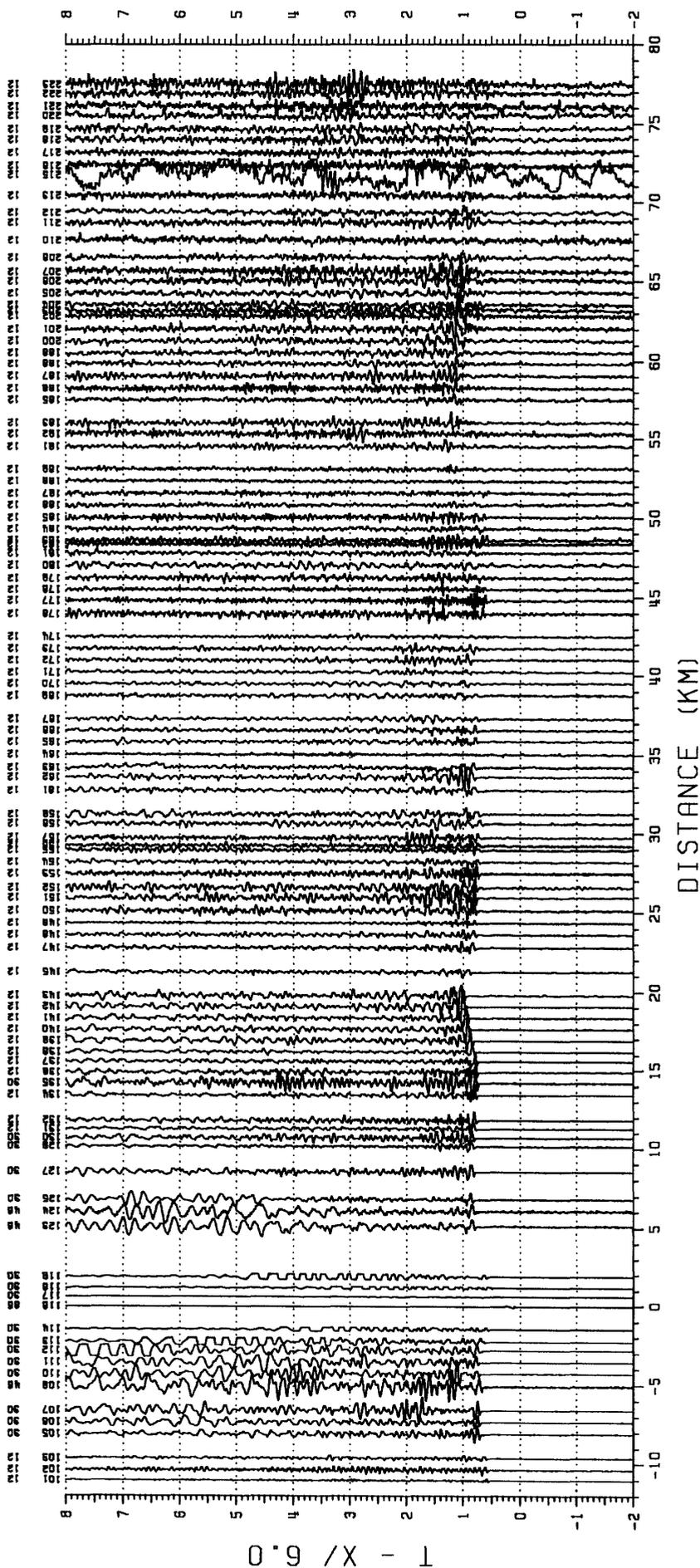
1 - X / 6.0



Shot 13, Shotpoint 35

Normalized

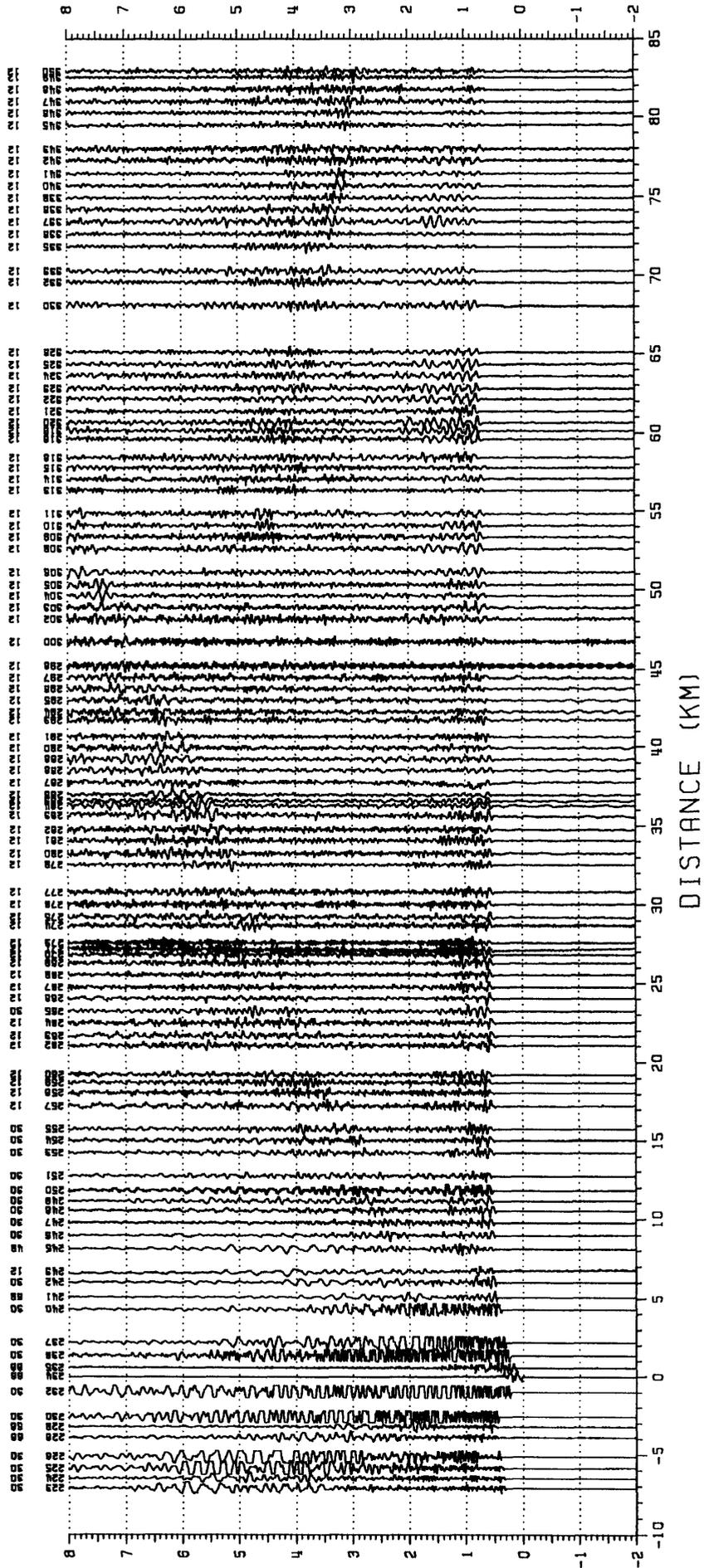
Figure 28



Shot 13, Shotpoint 35

True Amplitude

Figure 29

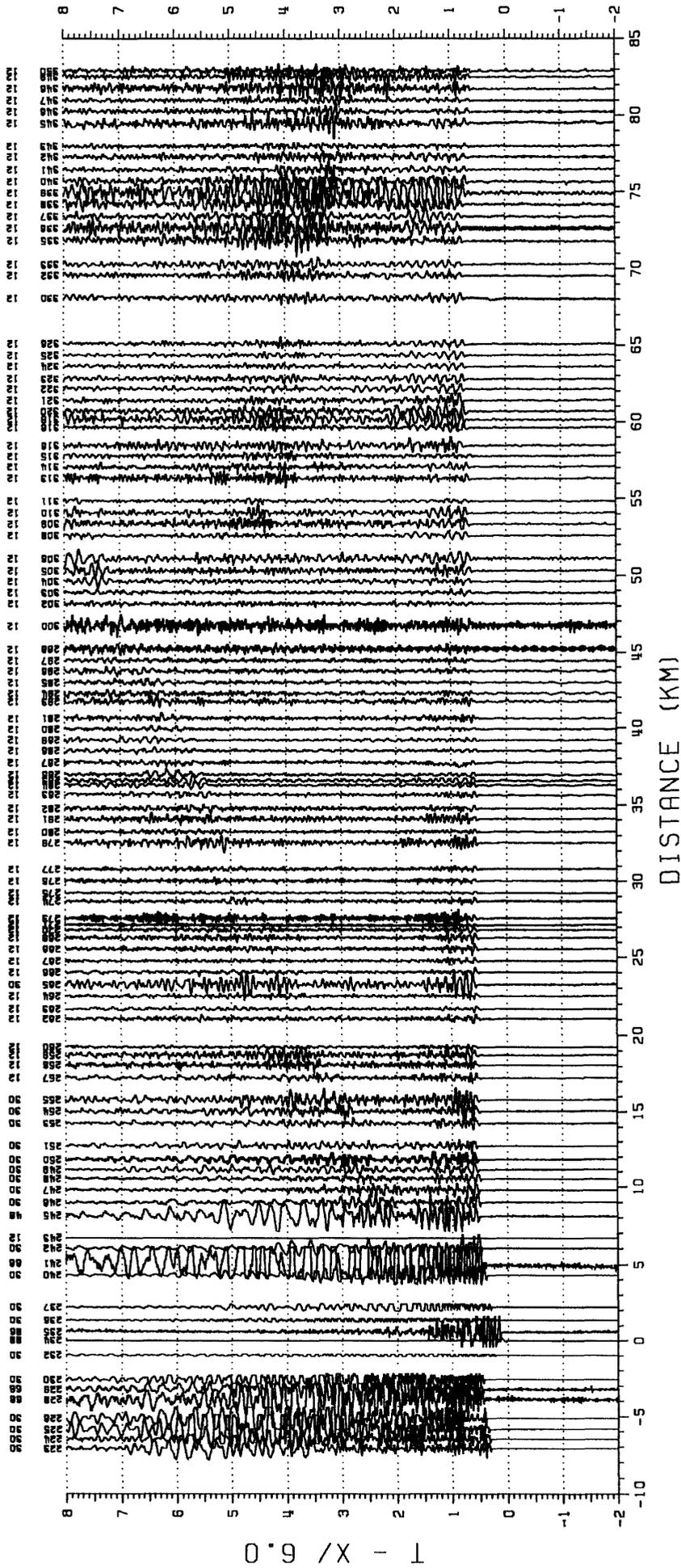


Shot 14, Shotpoint 27

Normalized

Figure 30

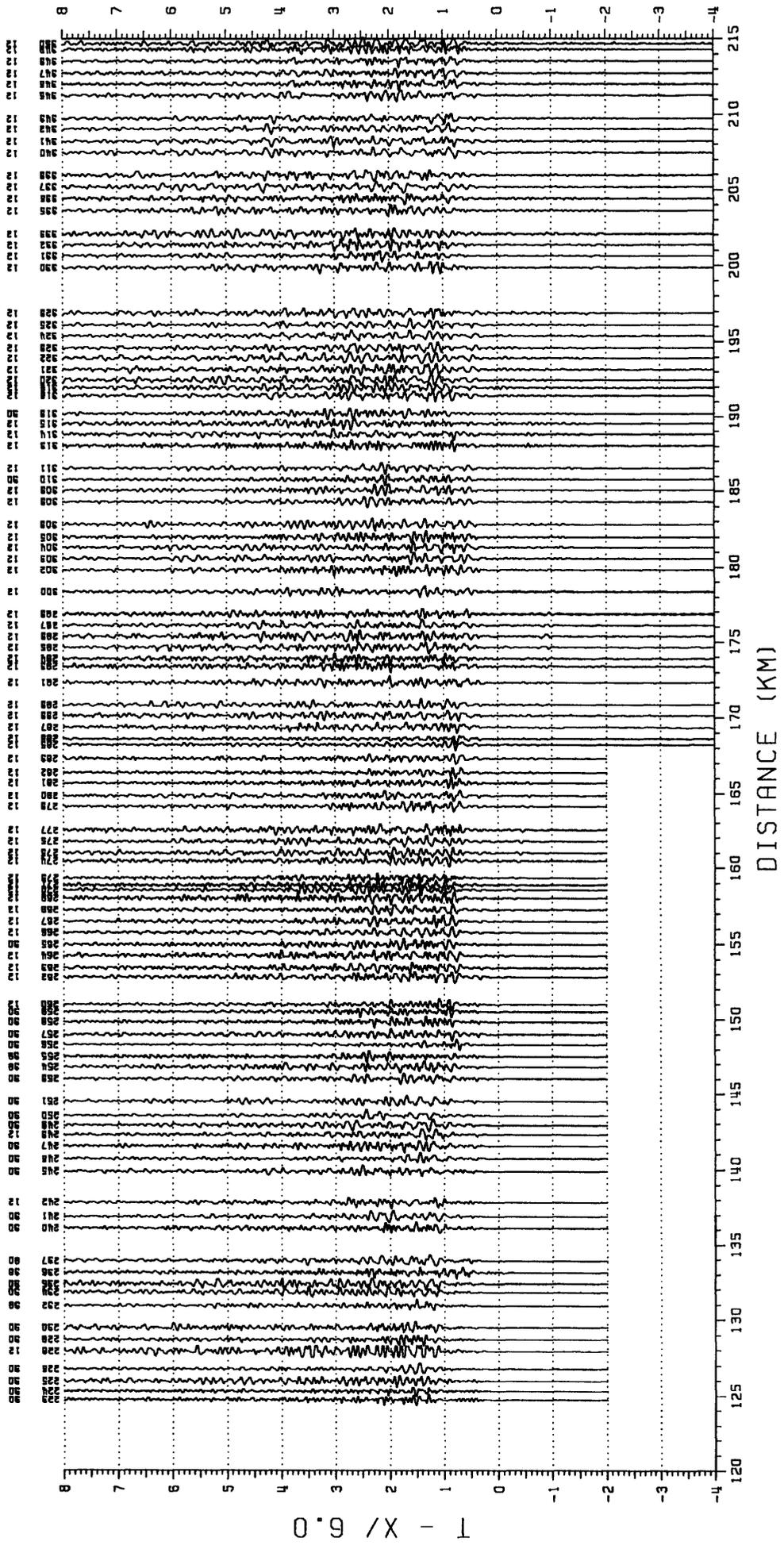
1 - X / 6.0



Shot 14, Shotpoint 27

True Amplitude

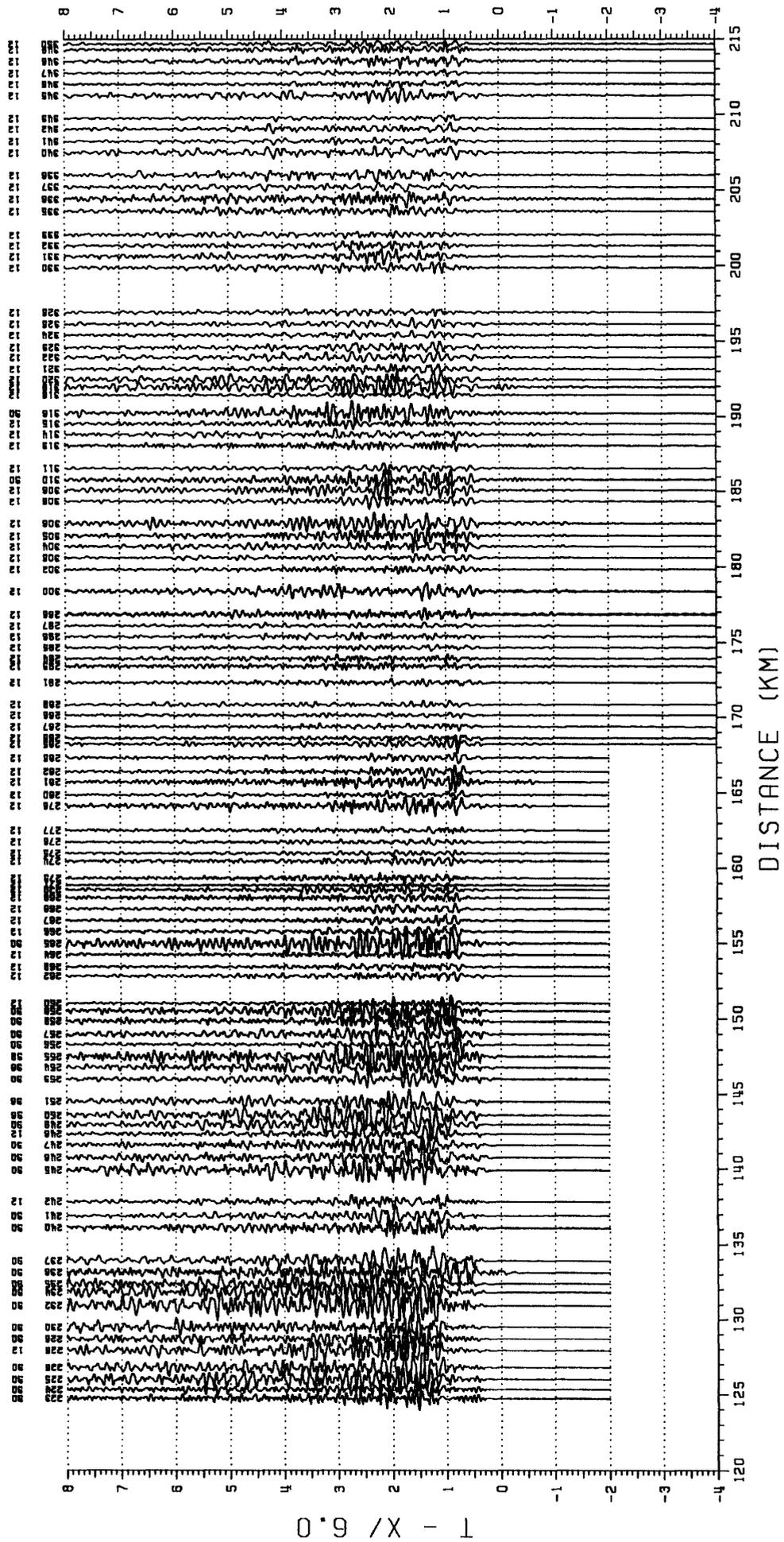
Figure 31



Shot 15, Shotpoint 20

Normalized

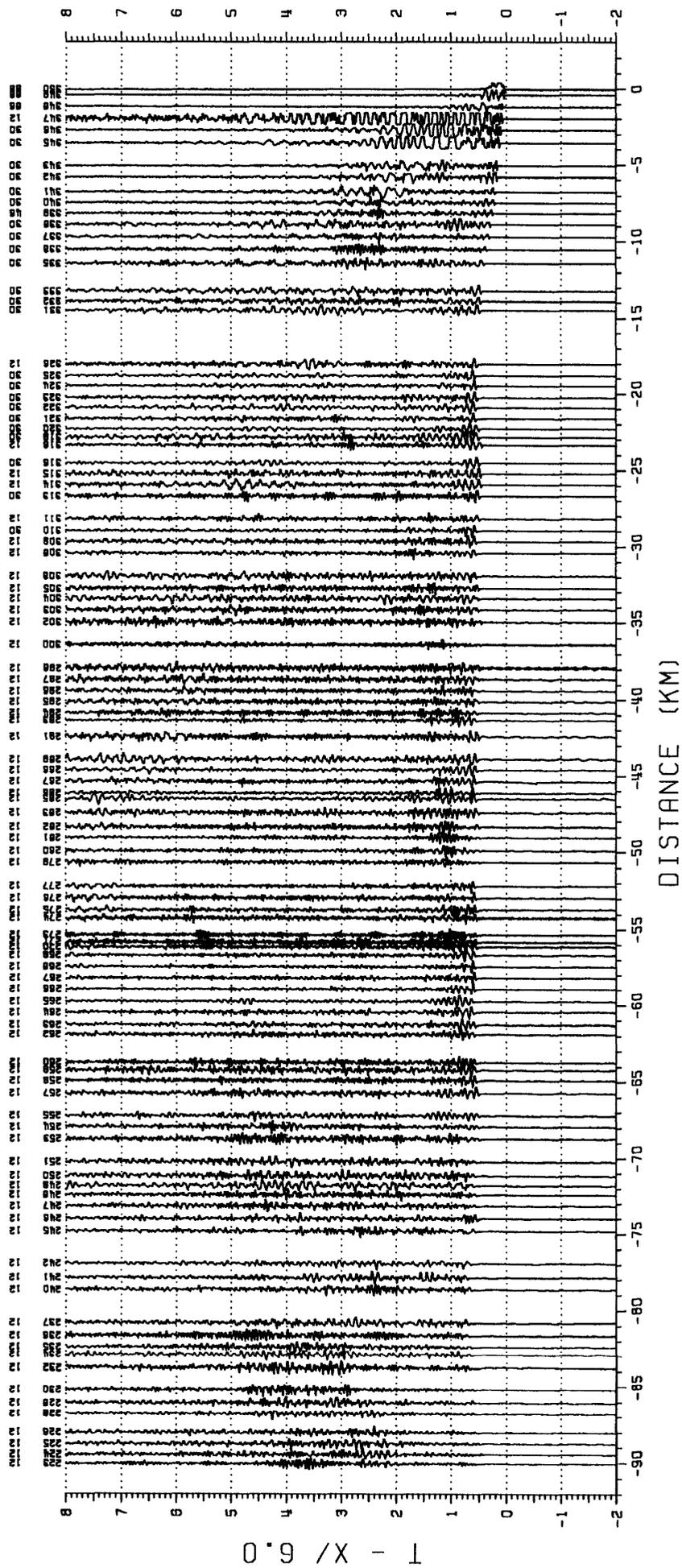
Figure 32



Shot 15, Shotpoint 20

True Amplitude

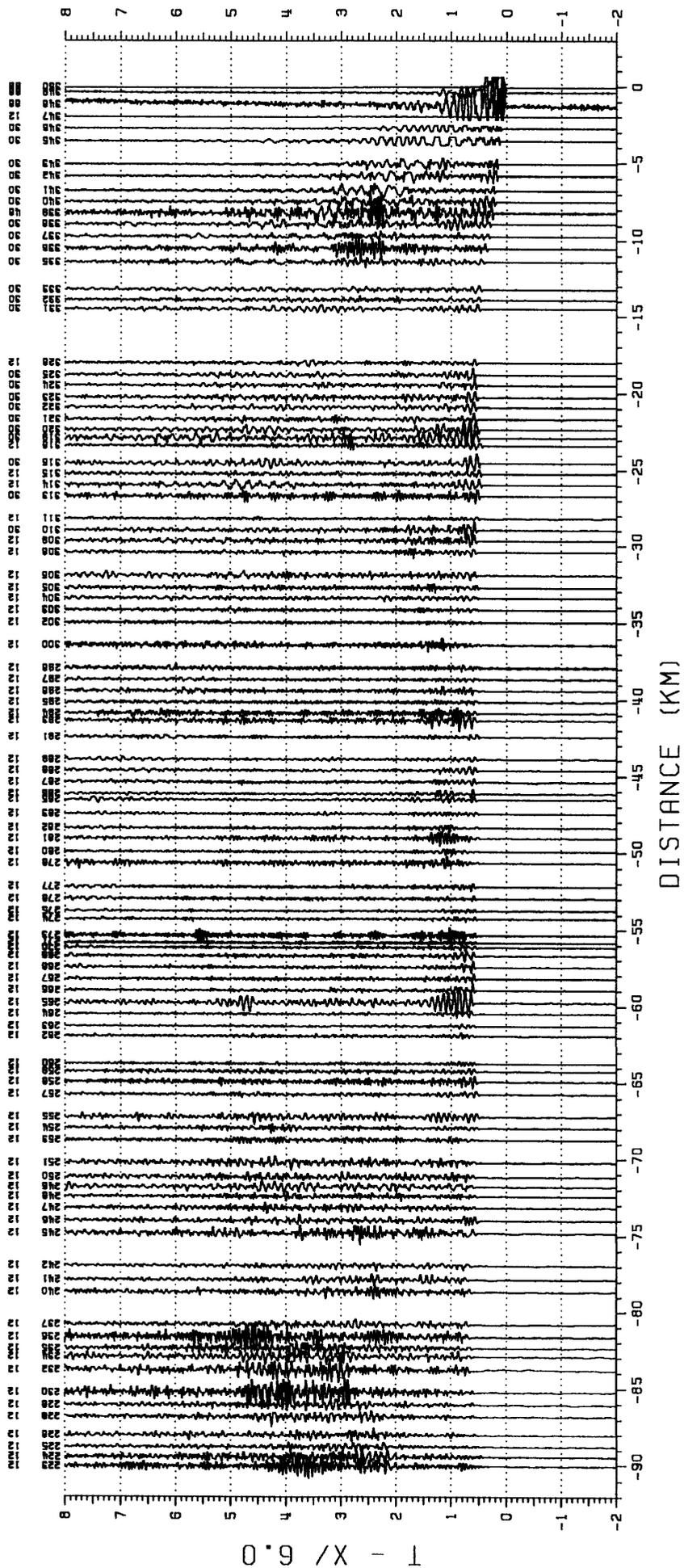
Figure 33



Shot 16, Shotpoint 31

Normalized

Figure 34

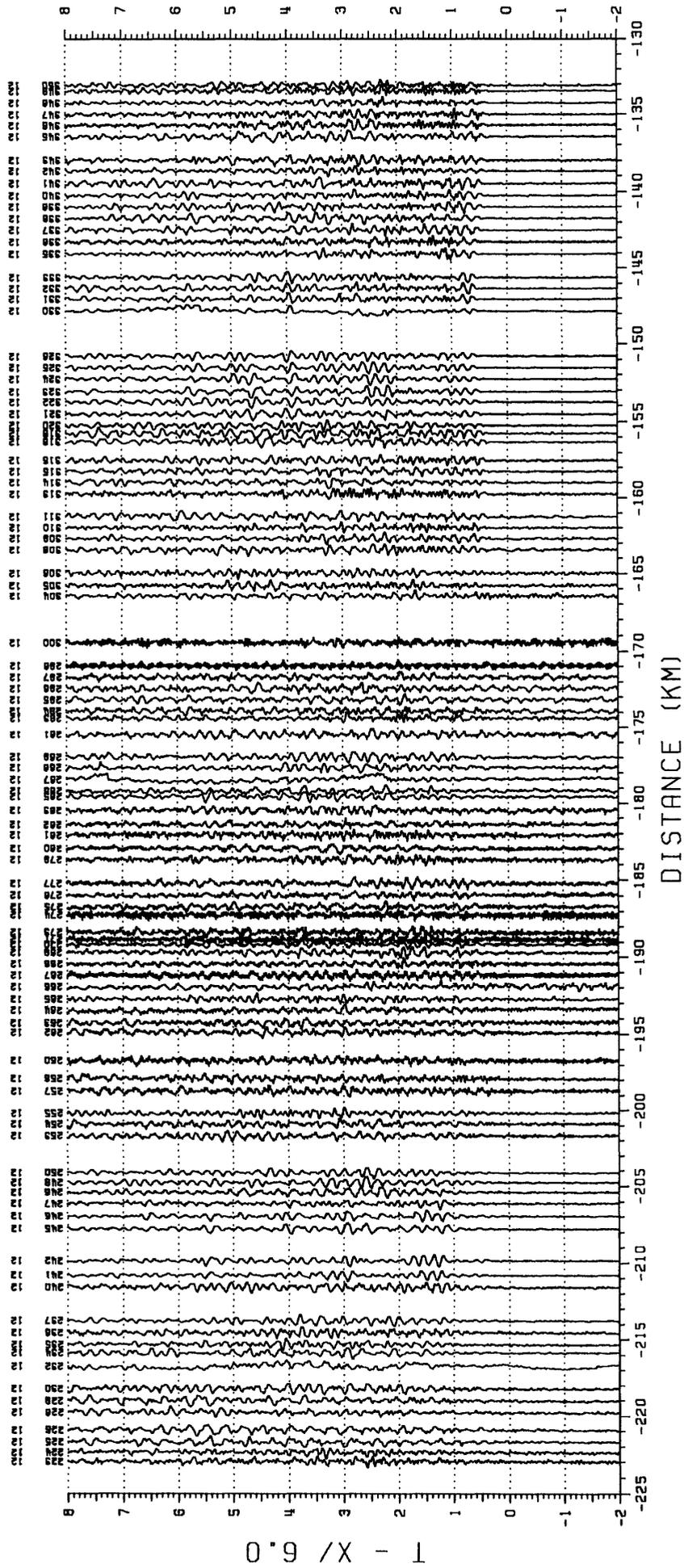


Shot 16, Shotpoint 31

True Amplitude

Figure 35

T - X / 6.0



Shot 17, Shotpoint 34

Normalized

Figure 36

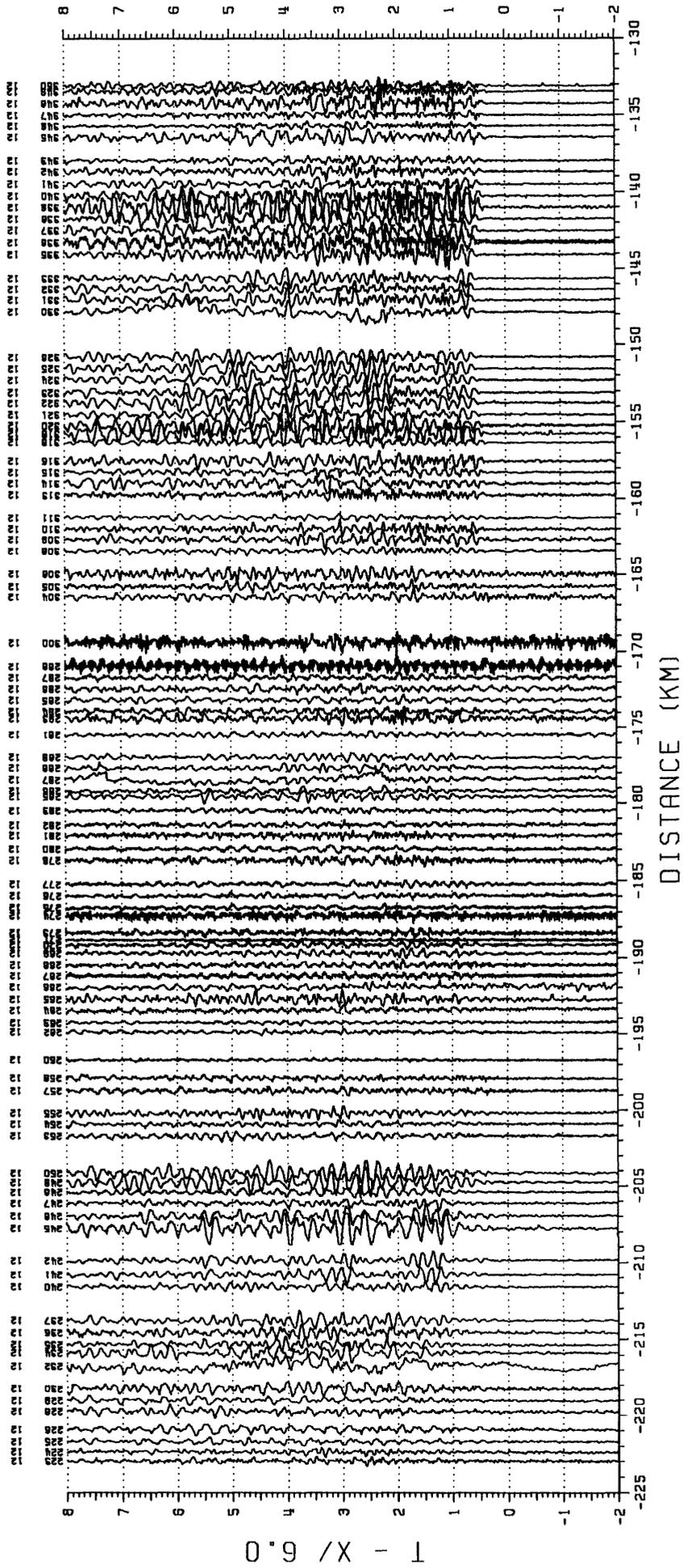
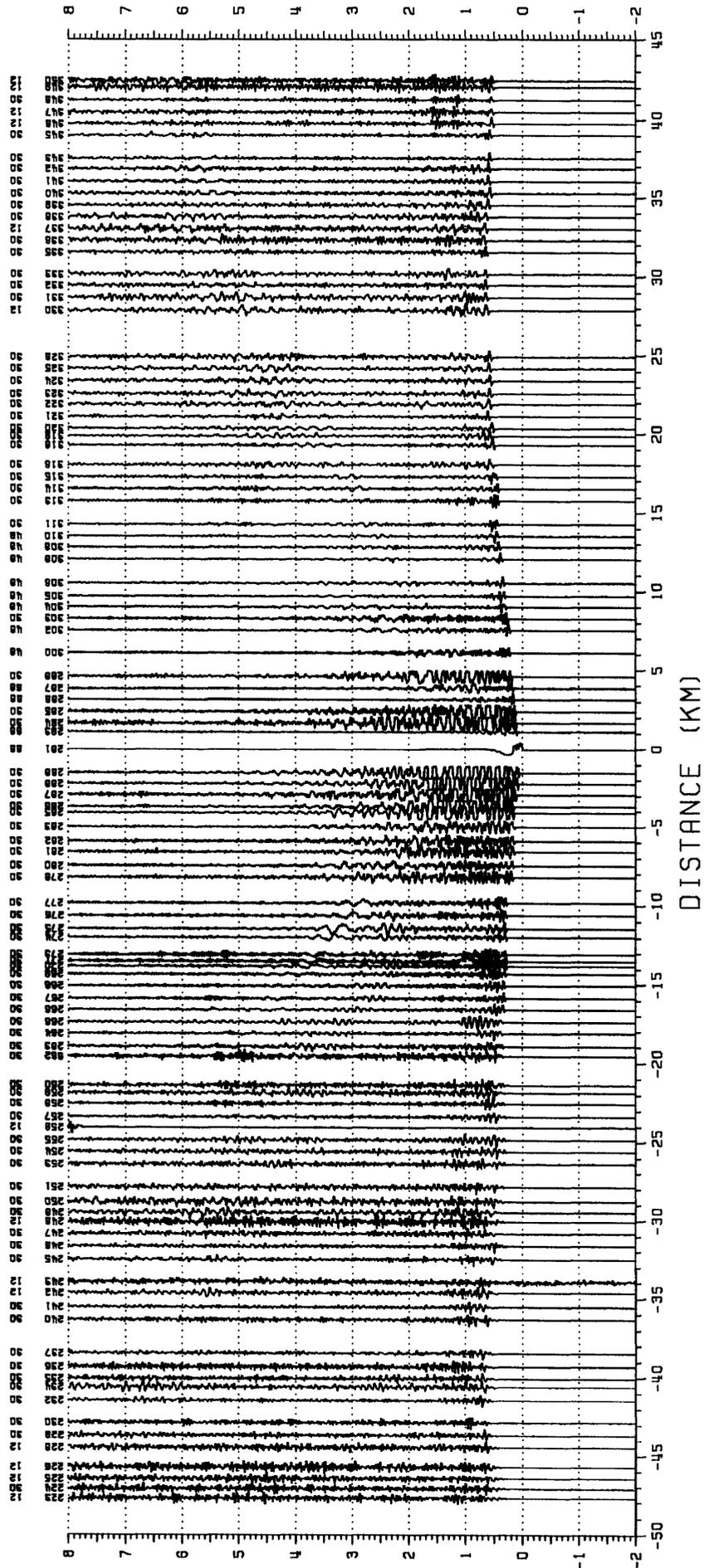


Figure 37

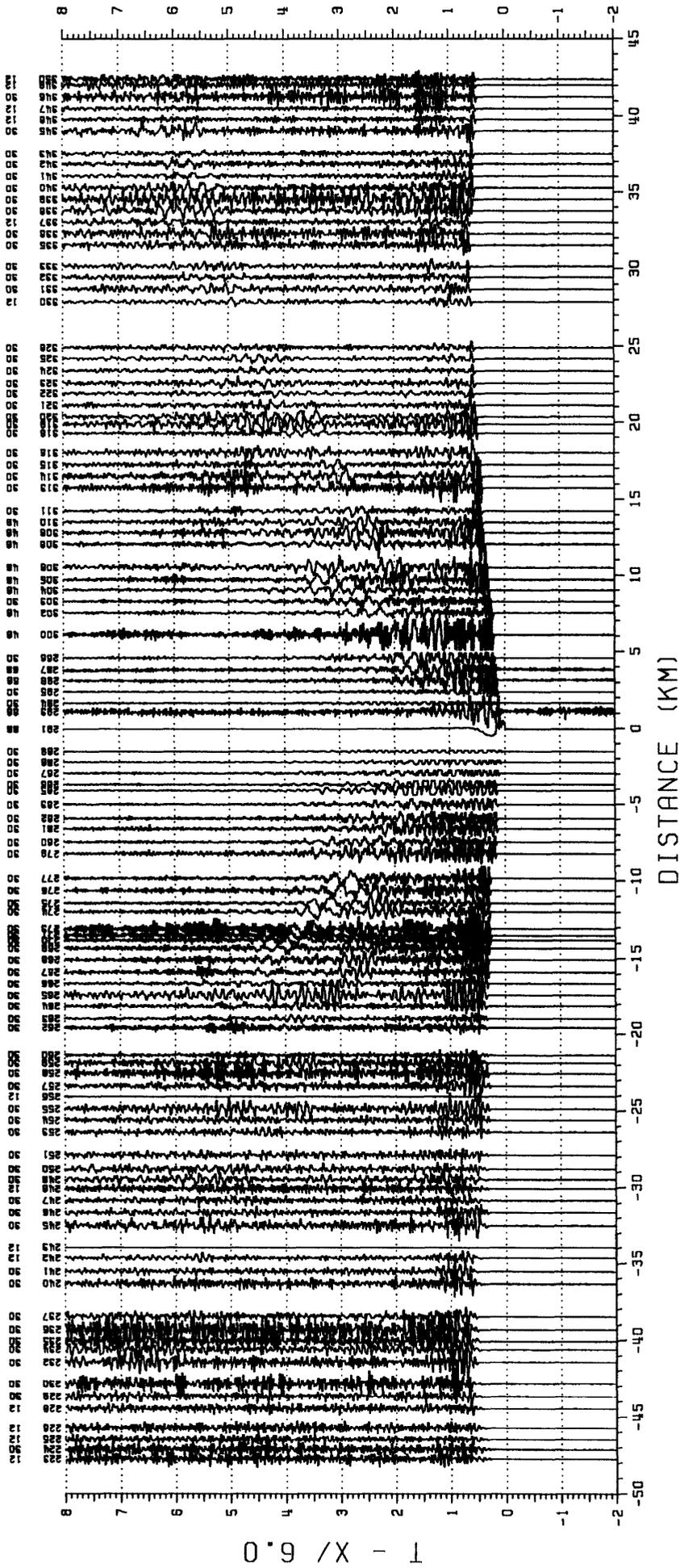


Shot 18, Shotpoint 29

Normalized

Figure 38

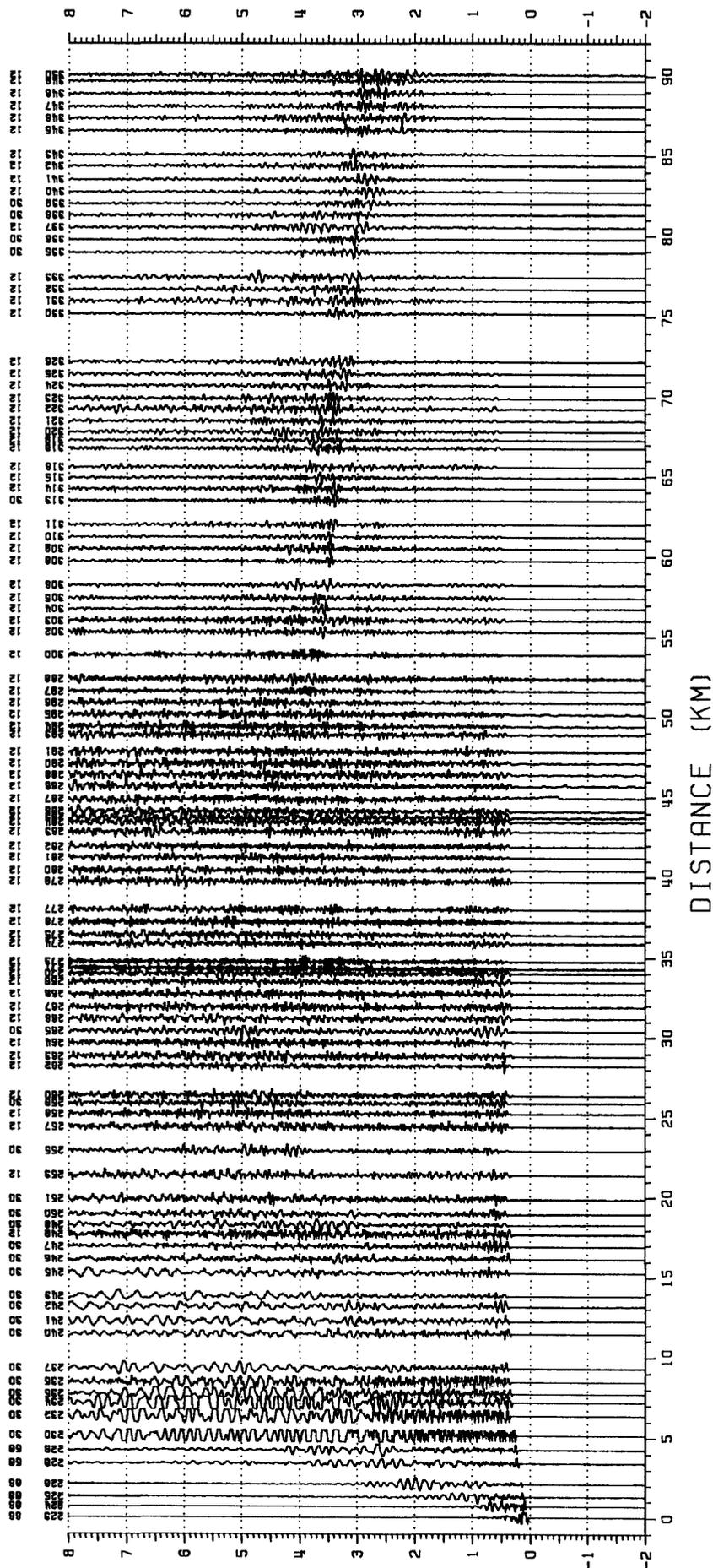
T - X / 6.0



Shot 18, Shotpoint 29

True Amplitude

Figure 39

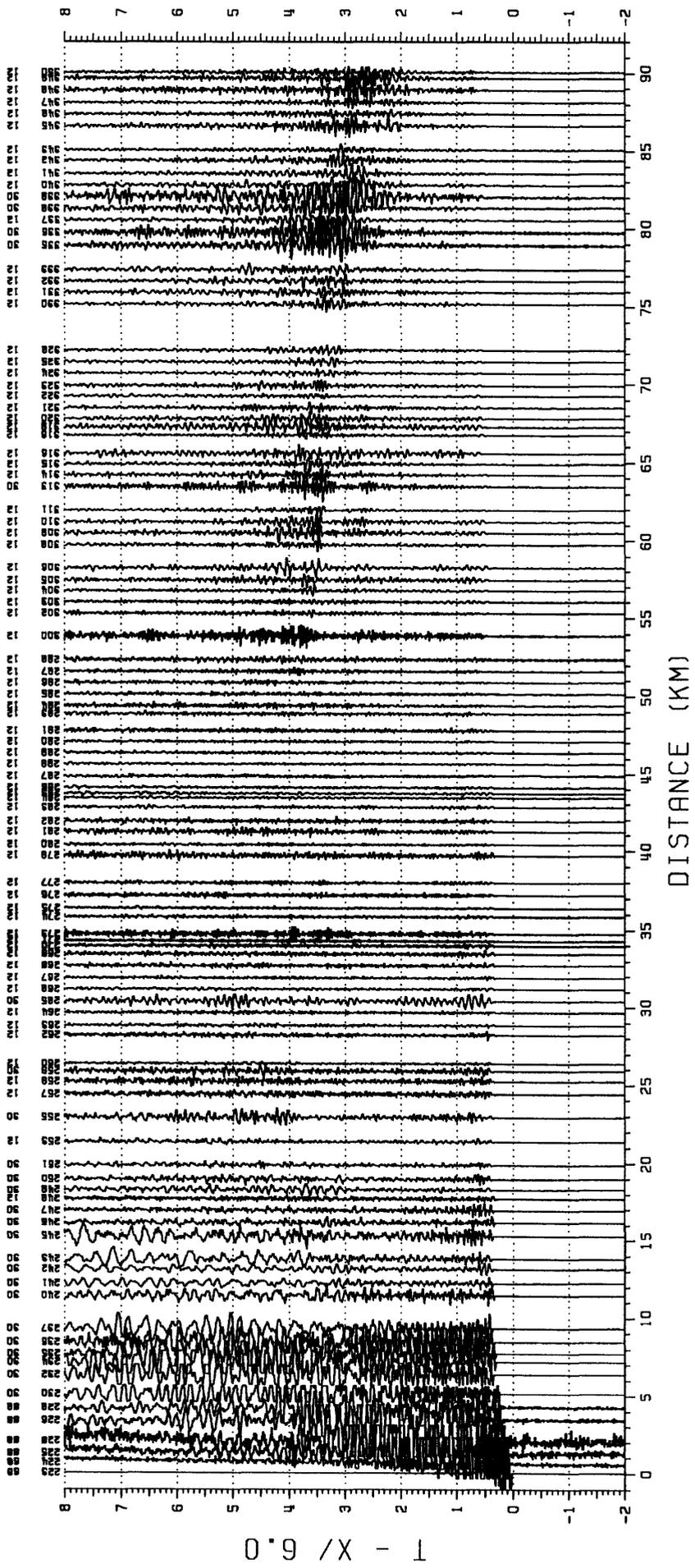


Shot 19, Shotpoint 26

Normalized

Figure 40

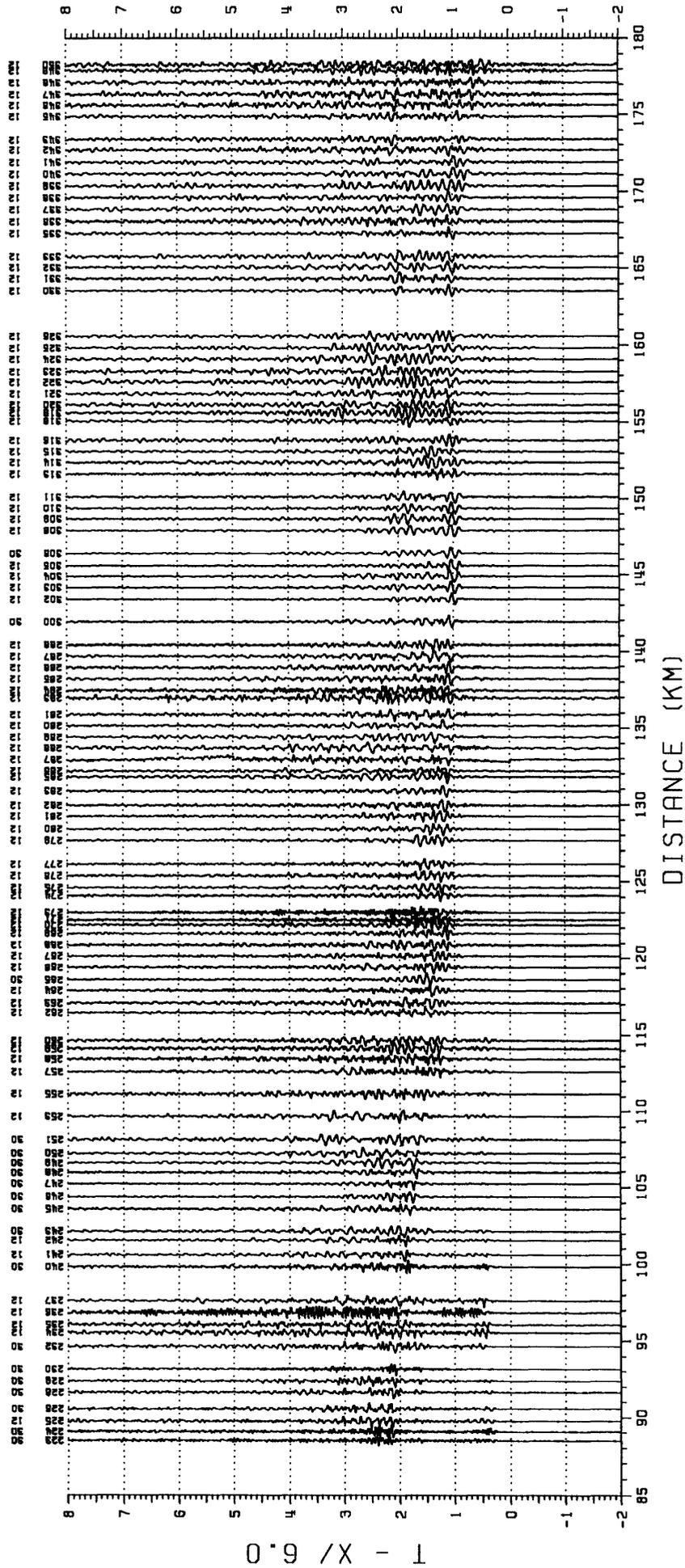
1 - X / 0.9



Shot 19, Shotpoint 26

True Amplitude

Figure 41

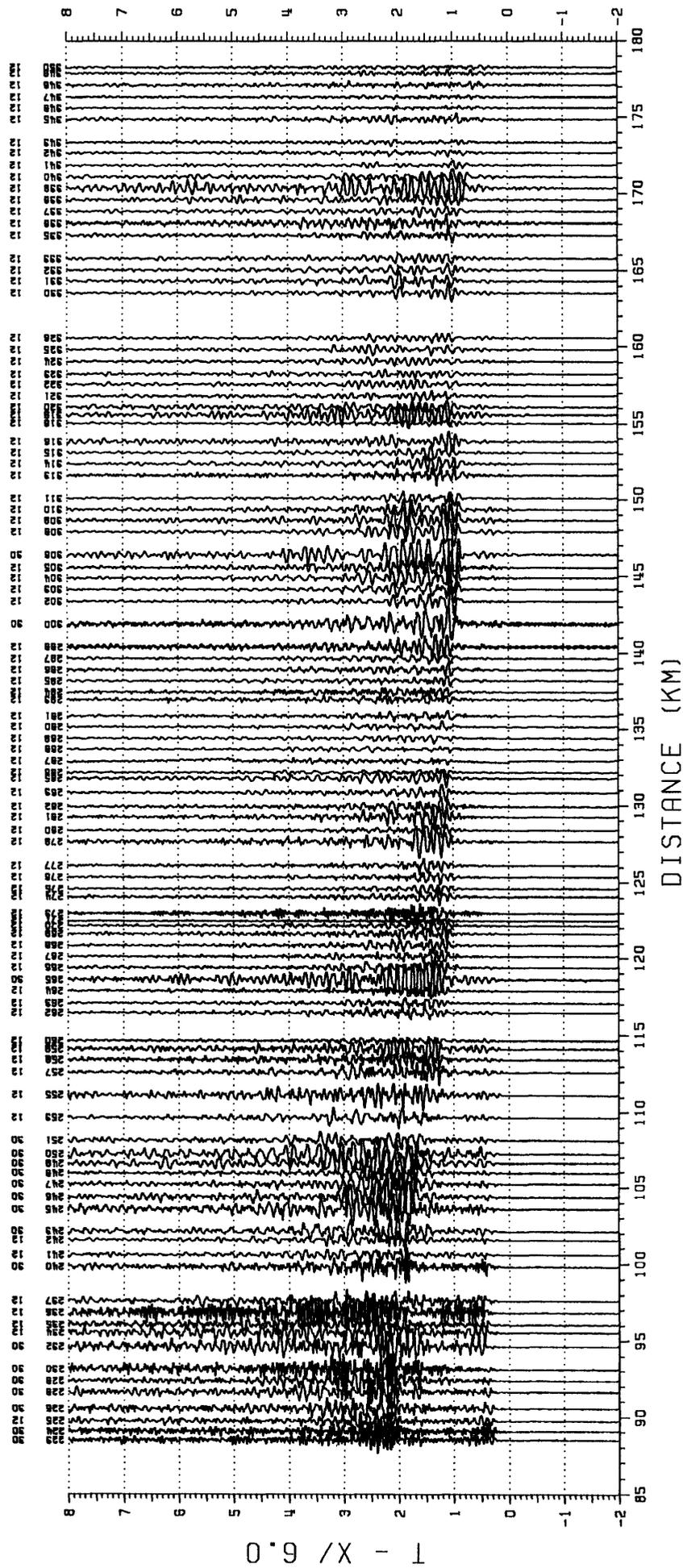


Shot 20, Shotpoint 21

Normalized

Figure 42

1 - X / 6.0

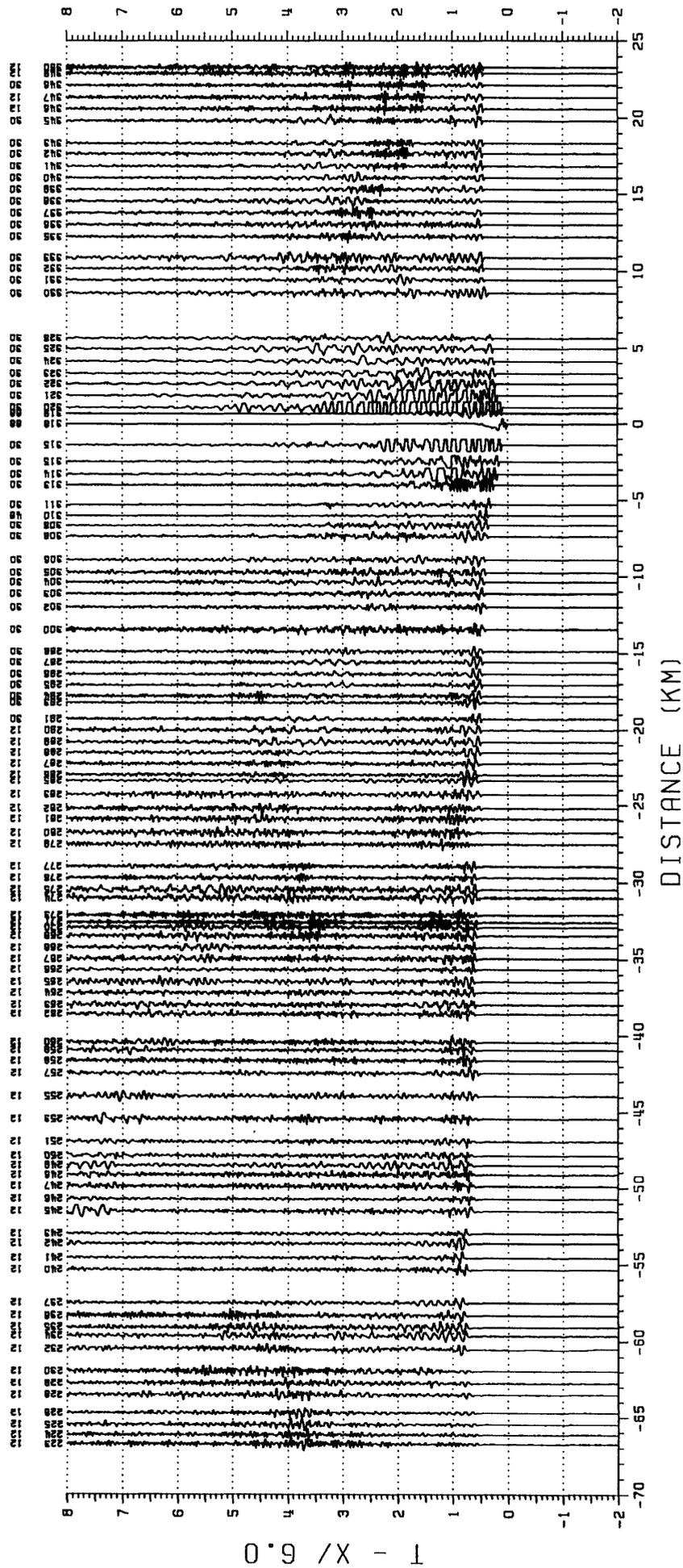


Shot 20, Shotpoint 21

True Amplitude

Figure 43

1 - X / 6.0

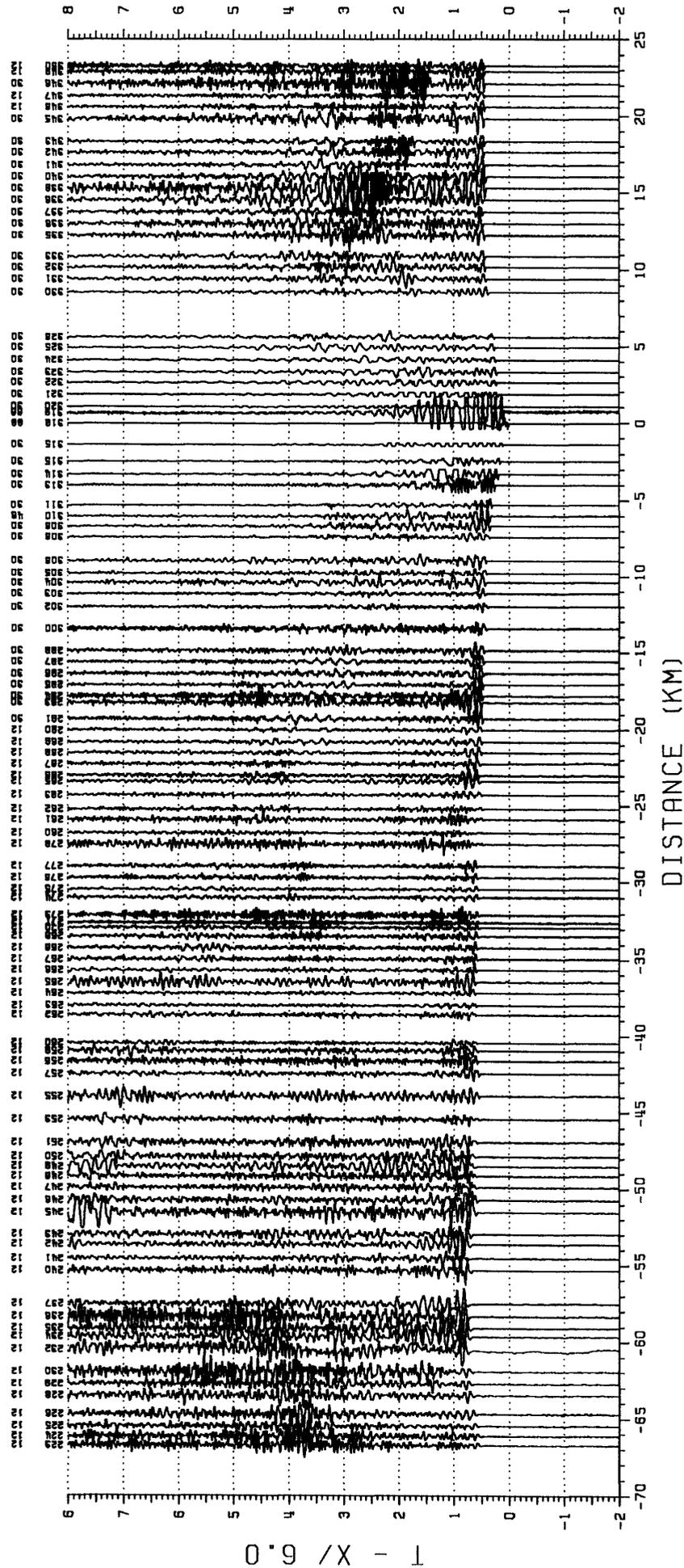


Shot 21, Shotpoint 30

Normalized

Figure 44

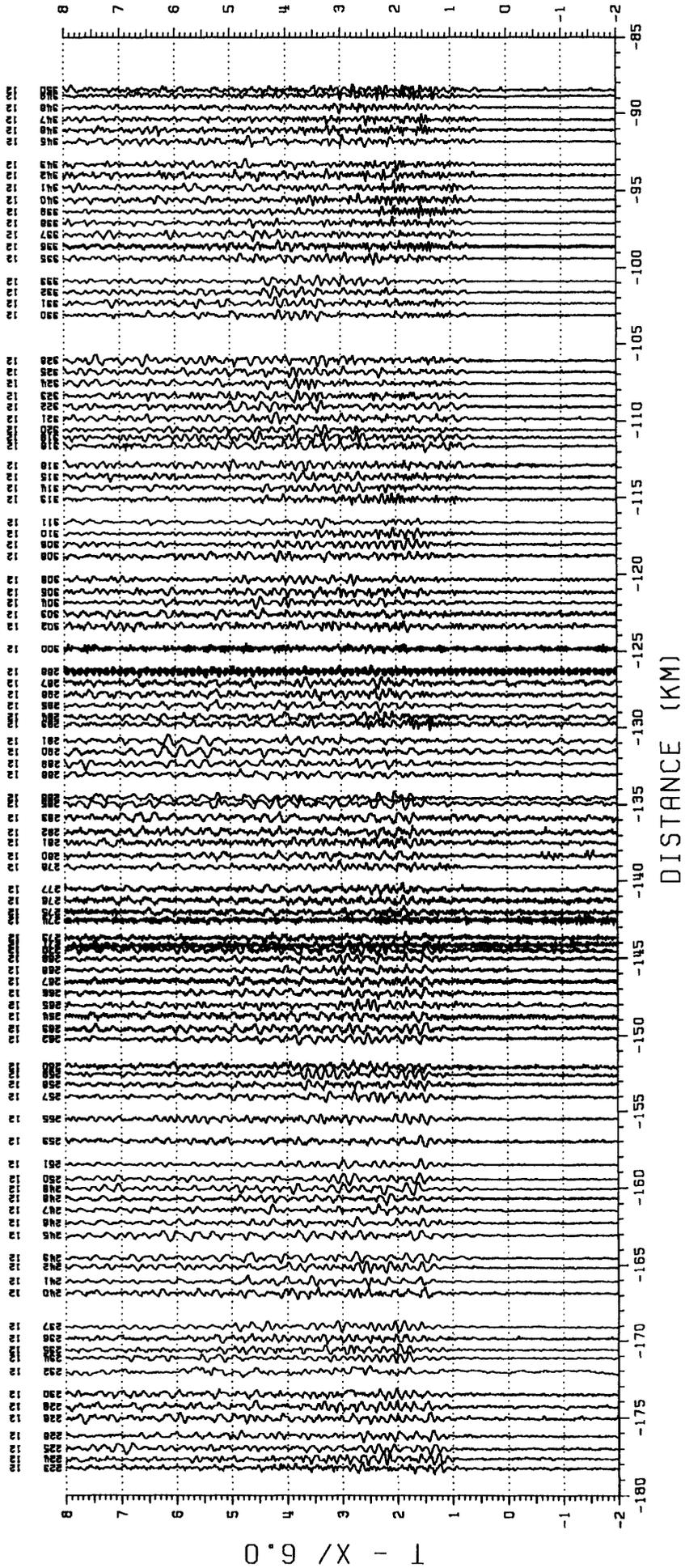
I - X / 6.0



Shot 21, Shotpoint 30

True Amplitude

Figure 45

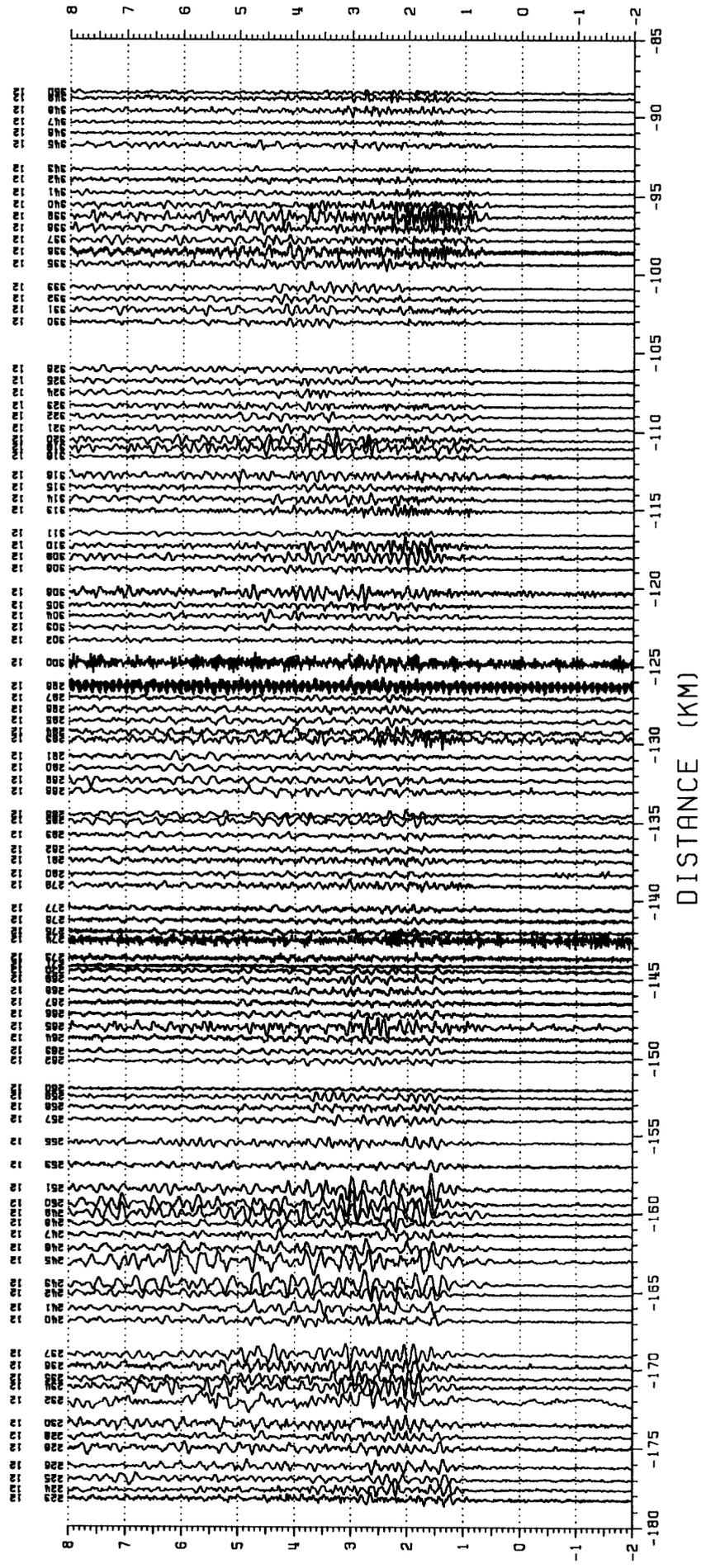


Shot 22, Shotpoint 33

Normalized

Figure 46

1 - X / 6.0

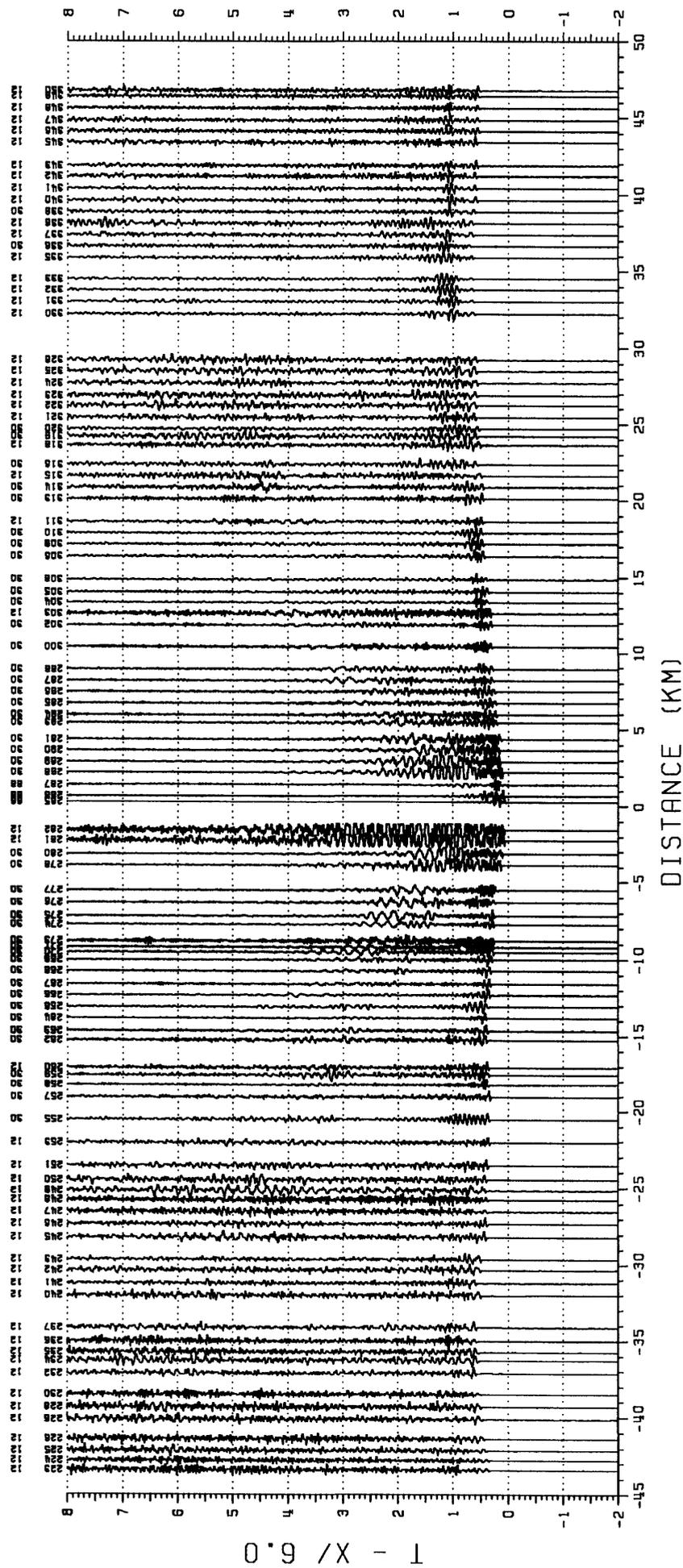


Shot 22, Shotpoint 33

True Amplitude

Figure 47

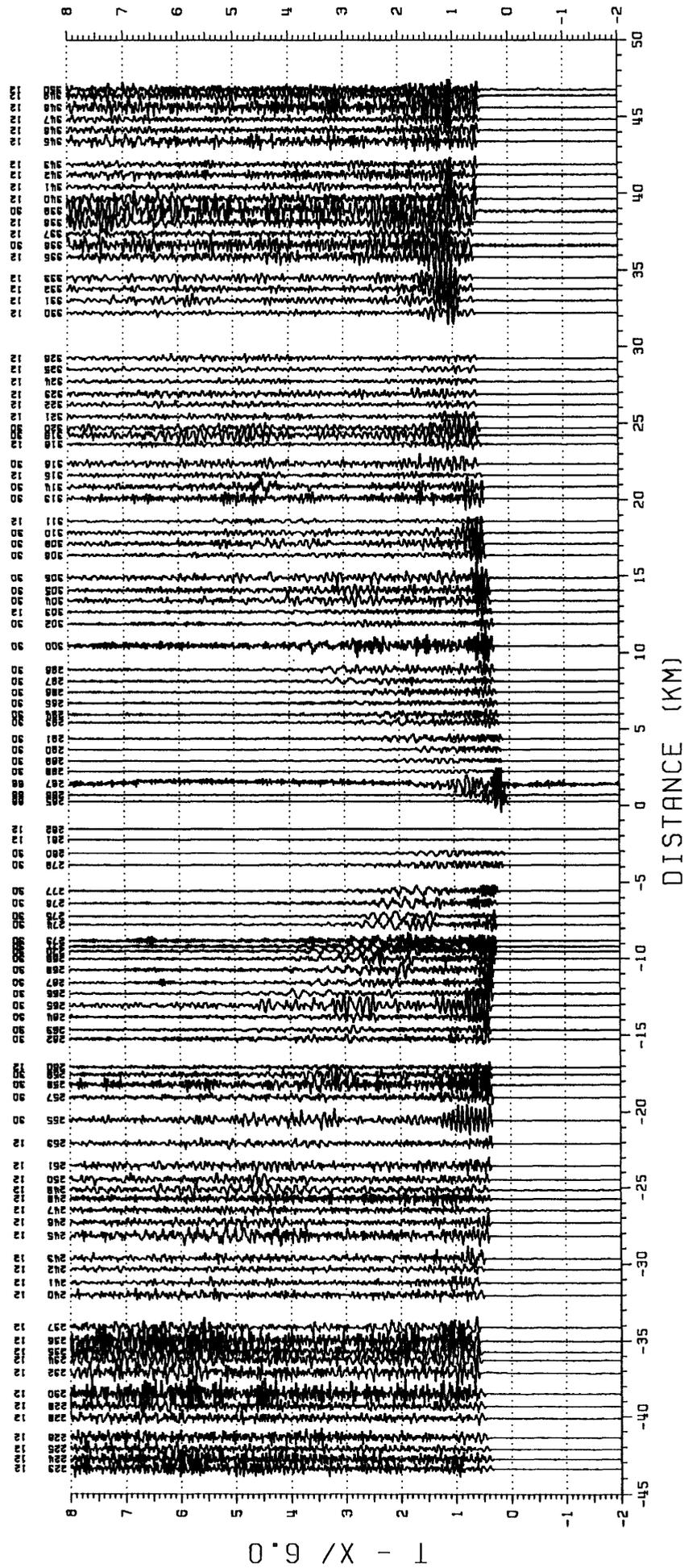
T - X / 6.0



Shot 23, Shotpoint 36

Normalized

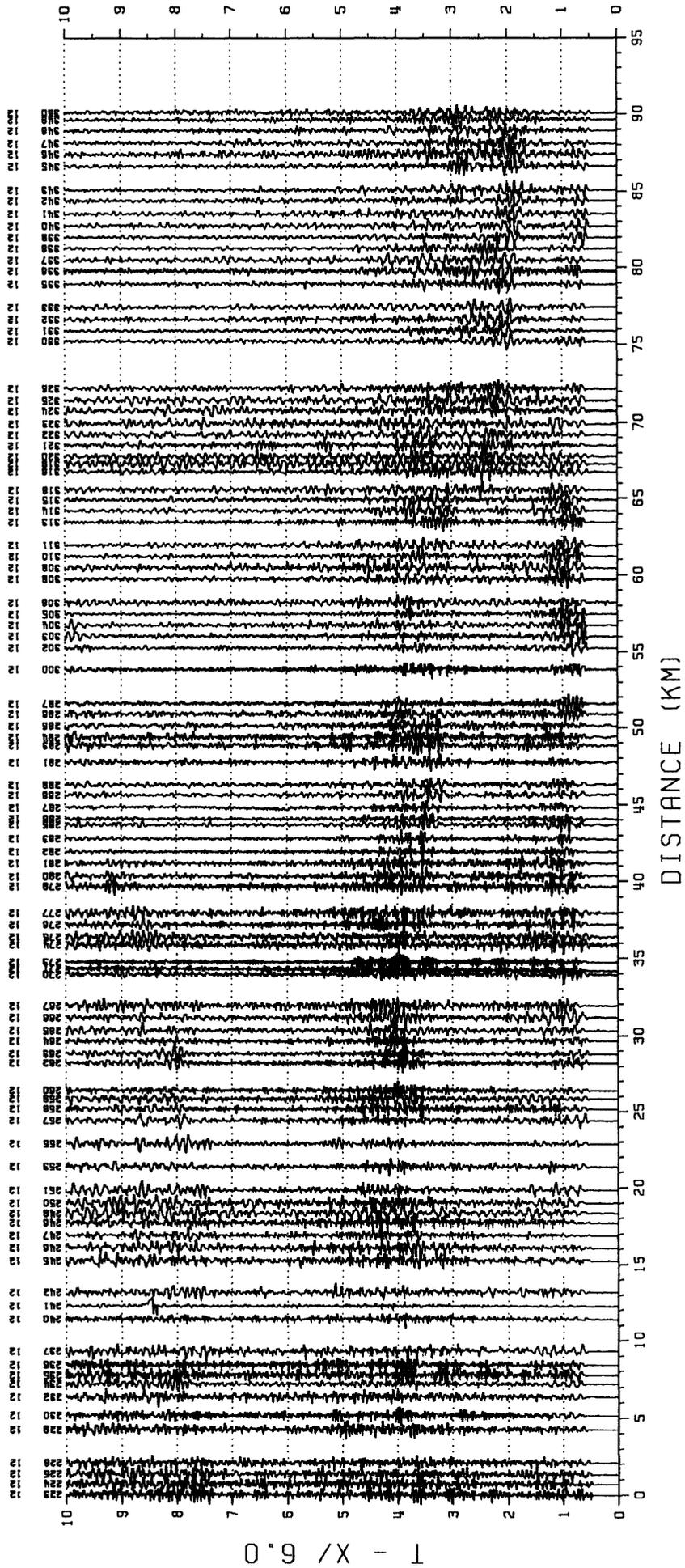
Figure 48



Shot 23, Shotpoint 36

True Amplitude

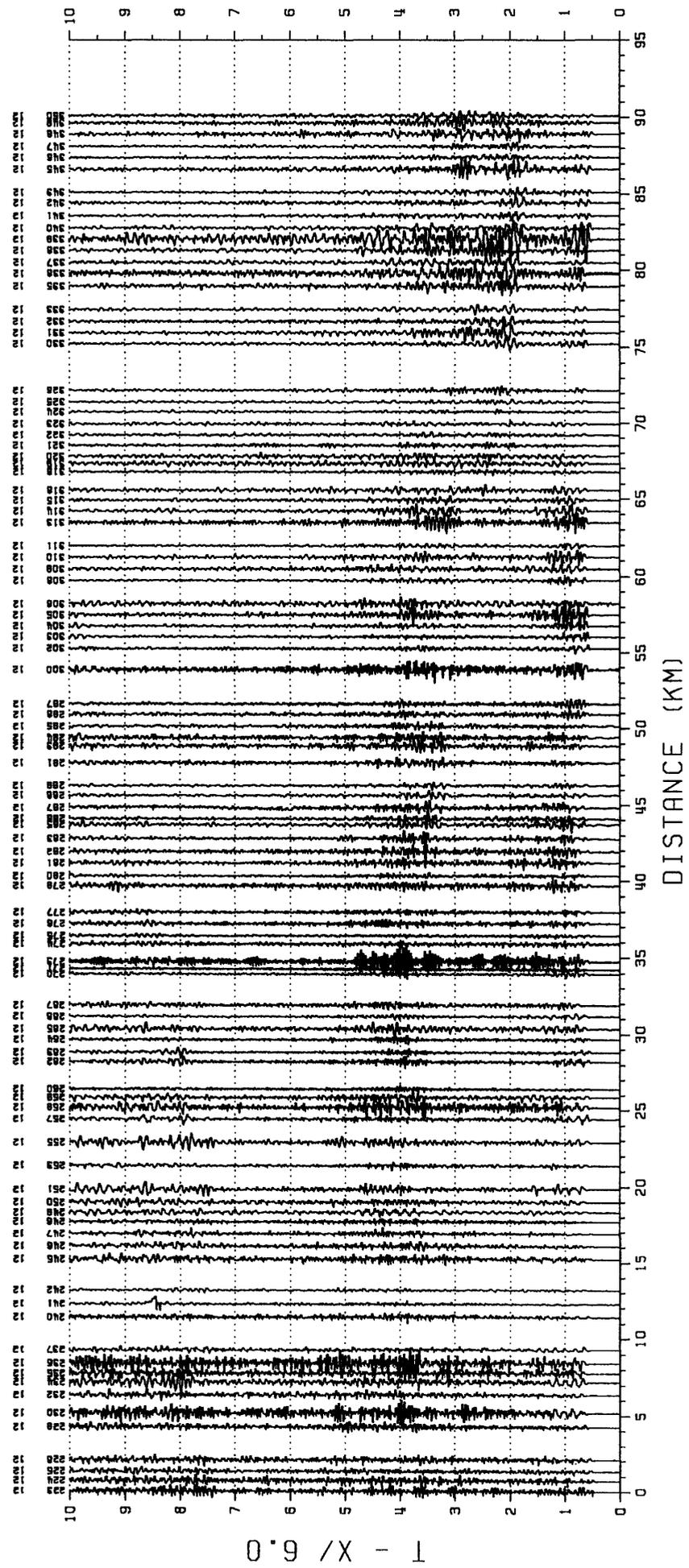
Figure 49



Shot 24, Shotpoint 7

Normalized

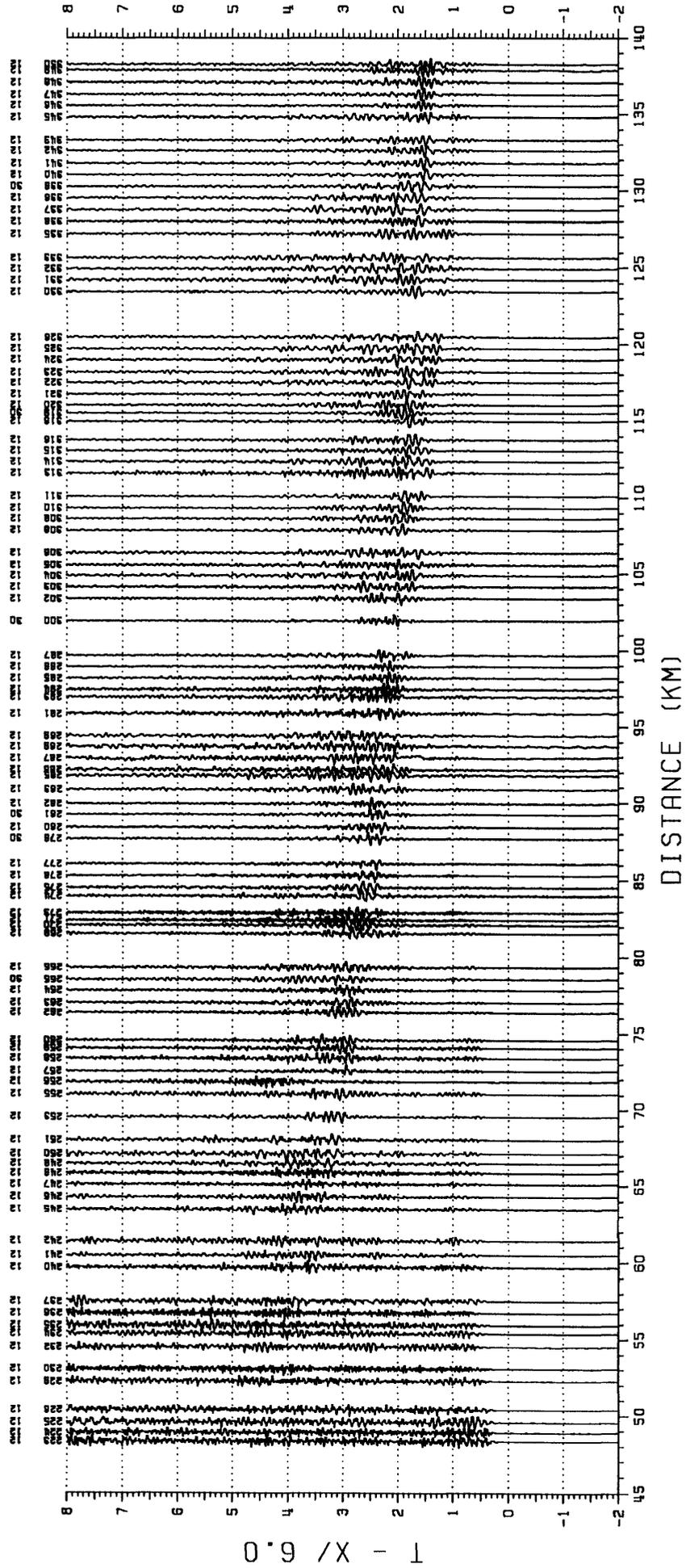
Figure 50



Shot 24, Shotpoint 7

True Amplitude

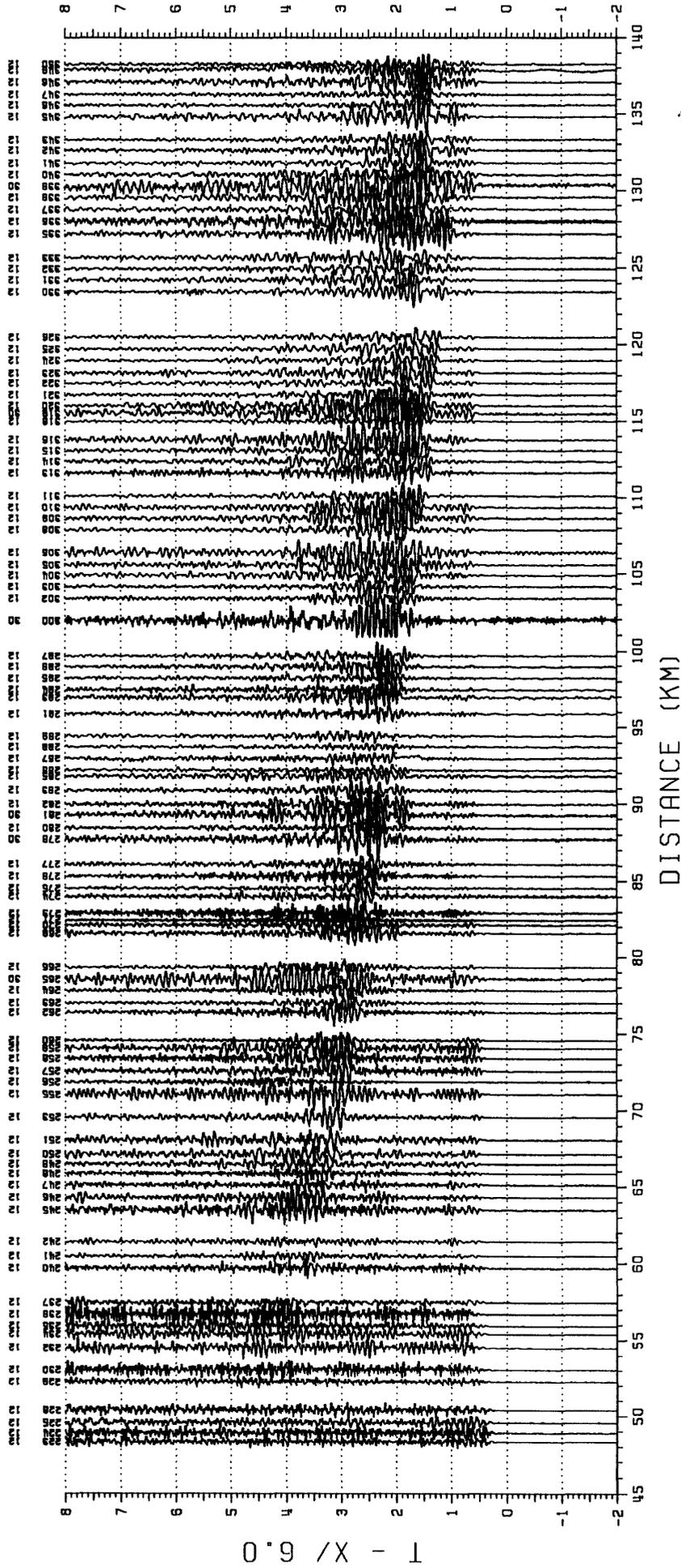
Figure 51



Shot 25, Shotpoint 23

Normalized

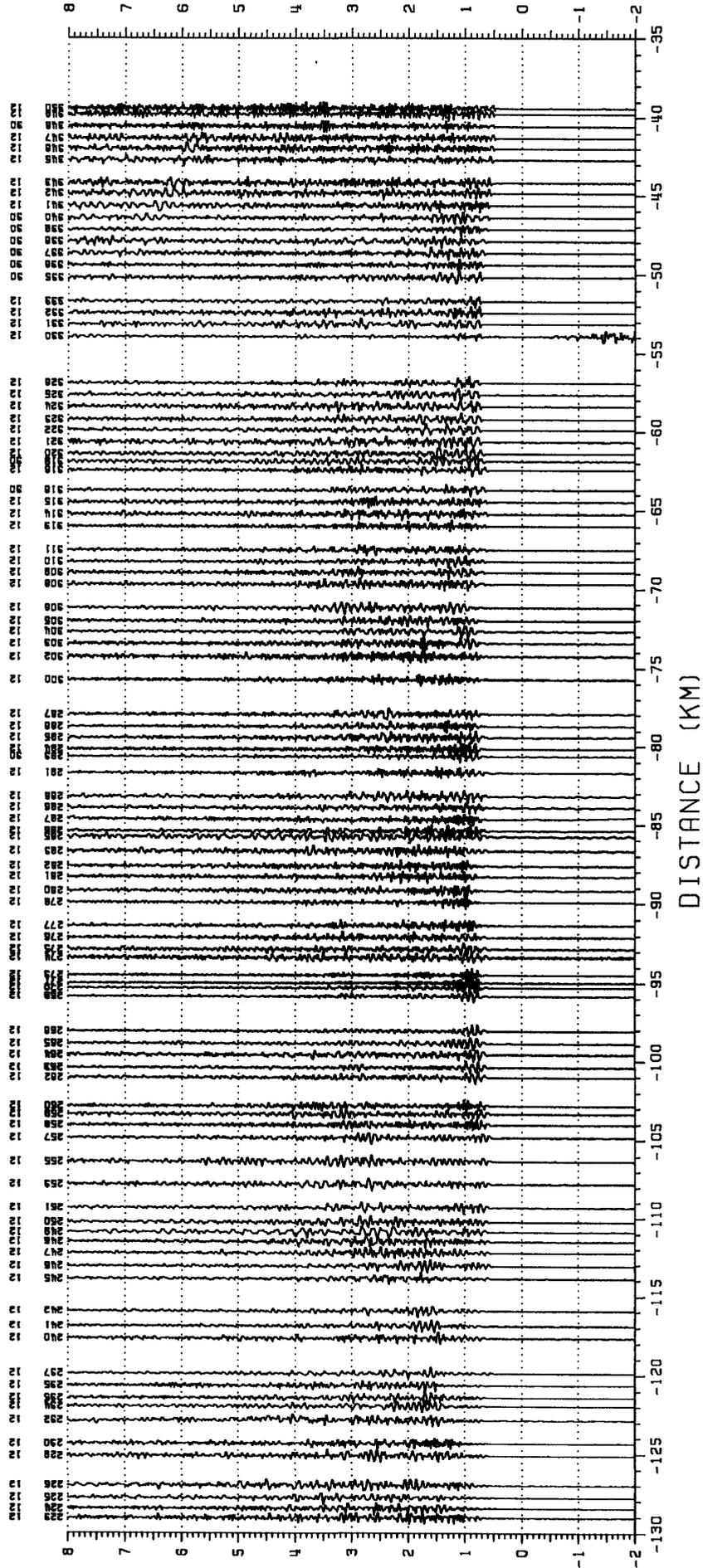
Figure 52



Shot 25, Shotpoint 23

True Amplitude

Figure 53

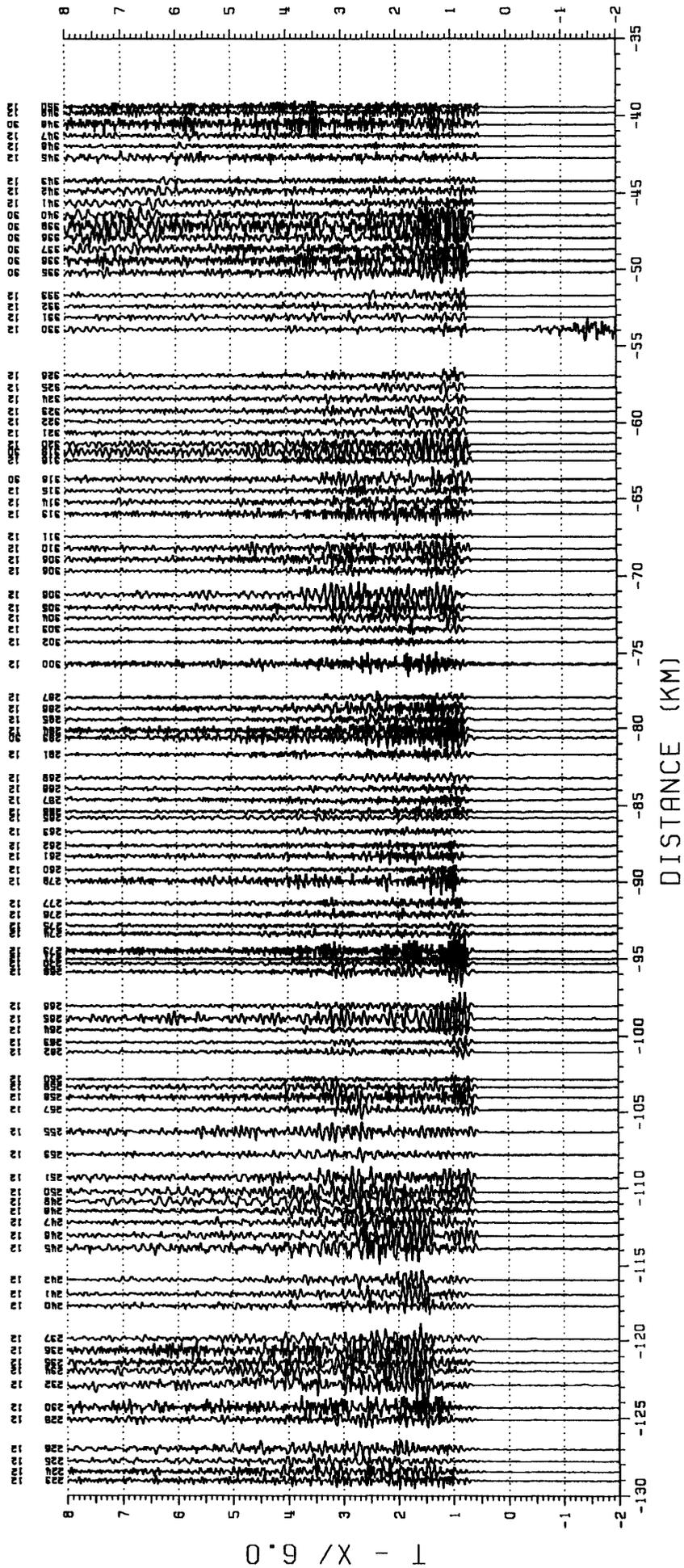


Shot 26, Shotpoint 32

Normalized

Figure 54

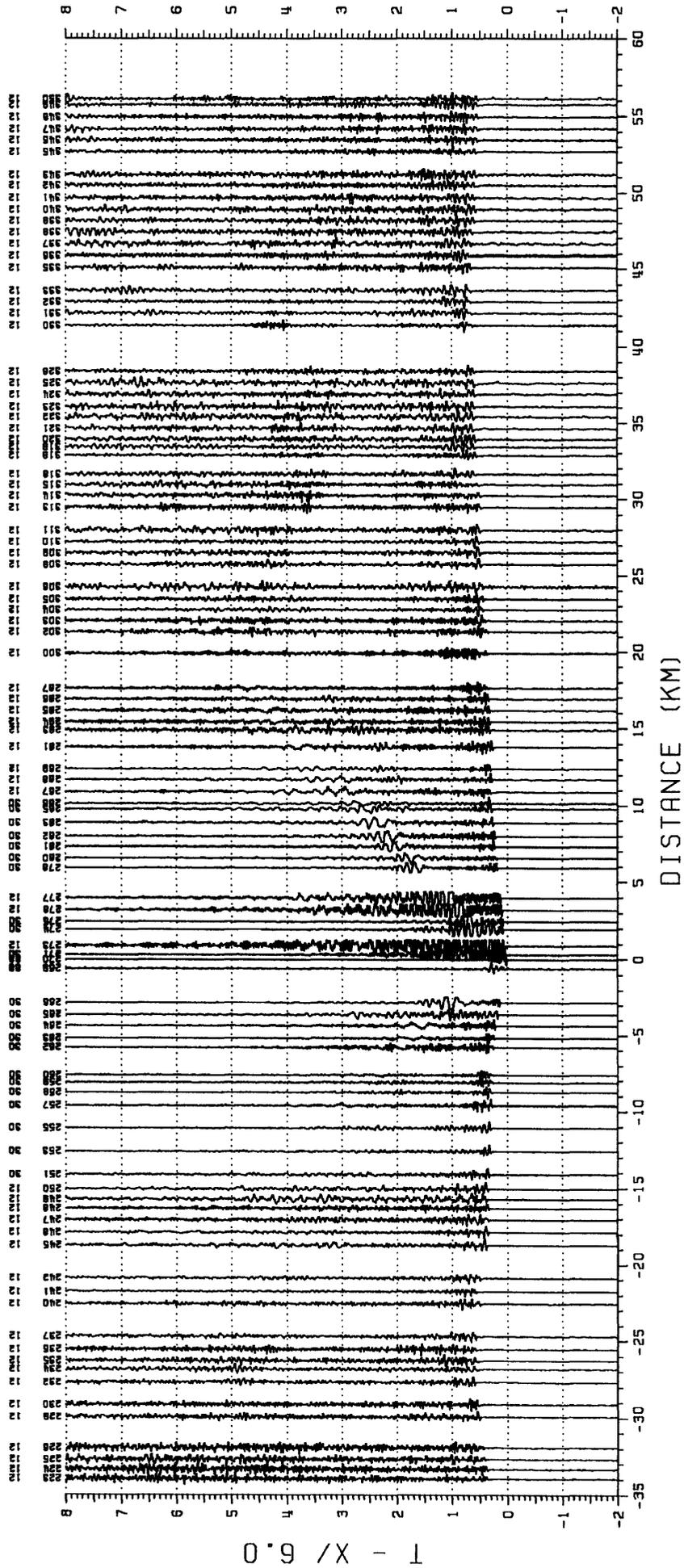
T - X / 6.0



Shot 26, Shotpoint 32

True Amplitude

Figure 55

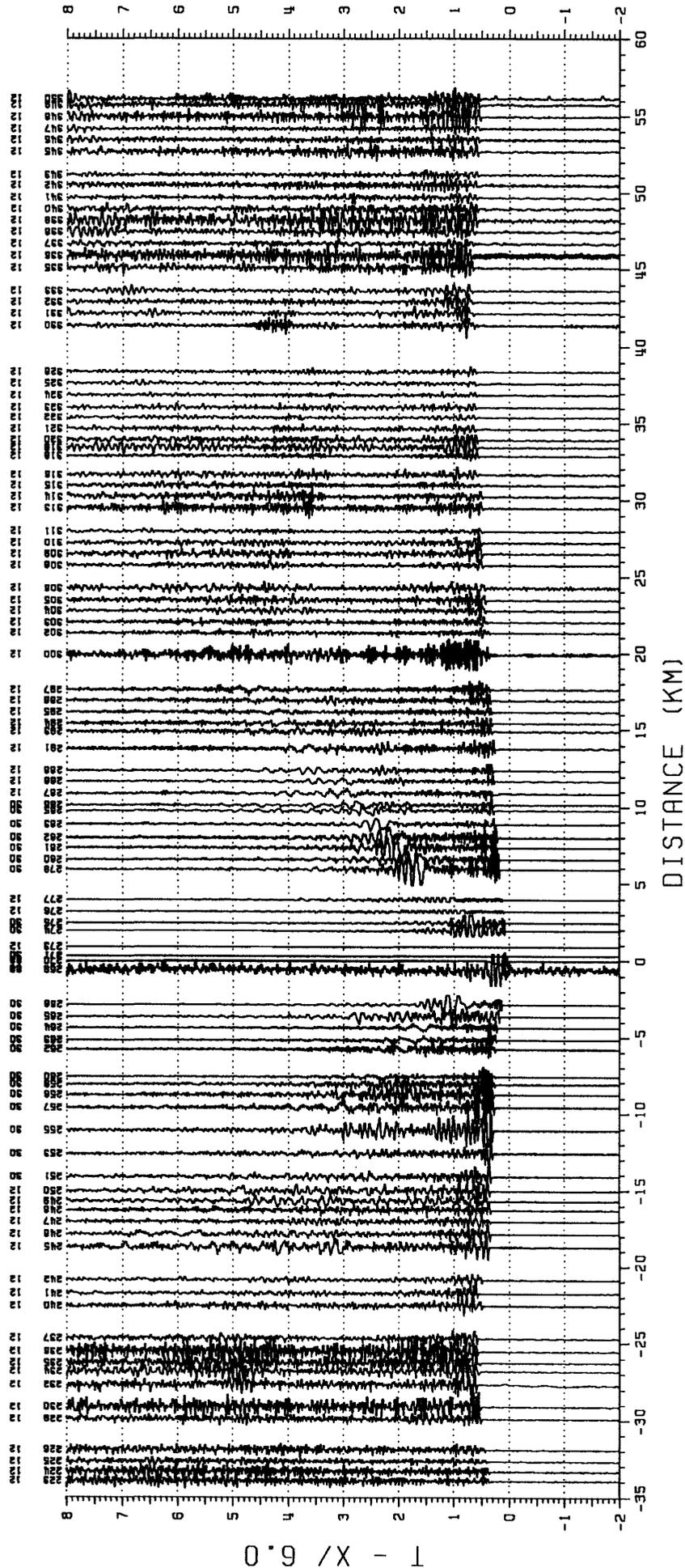


Shot 27, Shotpoint 28

Normalized

Figure 56

T - X / 6.0



Shot 27, Shotpoint 28

True Amplitude

Figure 57

APPENDIX A

Shot List

PACE 1987

Shot Number	Shot Point	Date	Shot Time (Day,Hour,Min,Sec)	Latitude (deg)	Longitude (deg)	Size (lbs)	
1	37	MAY 30, 87	152:05:00:00.007	33 28.1461	113 1.3237	2500	CORTEZ PEAK (15')
2	34	MAY 30, 87	152:05:02:00.012	35 39.2168	111 51.5679	6000	EBERT MTN (15')
3	31	MAY 30, 87	152:05:04:00.013	34 48.4497	112 53.7158	4000	CAMP WOOD (7.5)
4	20	MAY 30, 87	152:05:06:00.008	33 29.1606	114 35.7993	2500	MULE WASH (7.5)
5	26	MAY 30, 87	152:05:08:00.015	34 16.2932	113 37.9619	2000	ARTILLERY PEAK SW (ORTHO)
6	33	MAY 30, 87	152:08:02:00.010	35 23.5544	112 14.1611	6000	WILLIAMS (15')
7	22	MAY 30, 87	152:08:04:00.007	33 48.9227	114 3.9678	1500	BOUSE SE (ORTHO)
8	21	MAY 30, 87	152:08:06:00.007	33 40.9758	114 16.7080	2000	MIDDLE CAMP MTN (7.5')
9	24	MAY 30, 87	152:08:08:00.005	34 5.5299	113 51.9702	1000	SWANSEA SE (ORTHO)
10	25	MAY 30, 87	152:09:30:00.005	34 11.3601	113 45.3120	1500	SWANSEA NE (ORTHO)
11	23	MAY 30, 87	152:09:32:00.007	33 57.5299	113 59.7930	1000	BOUSE NE (ORTHO)
12	28	MAY 30, 87	152:09:34:00.023	34 27.8904	113 20.7471	3000	ARAISTRA MTN NE (7.5)
13	35	MAY 30, 87	152:09:36:00.010	33 45.2122	114 11.7163	1000	BOUSE SW (ORTHO)
14	27	JUN 2, 1987	155:05:00:00.010	34 18.6804	113 34.2969	1500	ARTILLERY PEAK SE (ORTHO)
15	20	JUN 2, 1987	155:05:02:00.005	33 29.1606	114 35.7993	5000	MULE WASH (7.5')
16	31	JUN 2, 1987	155:05:04:00.010	34 48.4497	112 53.7158	2000	CAMP WOOD (7.5')
17	34	JUN 2, 1987	155:05:06:00.012	35 39.2168	111 51.5679	6000	EBERT MTN (15')
18	29	JUN 2, 1987	155:05:08:00.008	34 32.3723	113 13.5576	1000	BAGDAD (7.5')
19	26	JUN 2, 1987	155:07:30:00.010	34 16.2932	113 37.9619	2000	ARTILLERY PEAK SW (ORTHO)
20	21	JUN 3, 1987	155:07:31:59.871	33 40.9758	114 16.7080	4000	MIDDLE CAMP MTN (7.5')
21	30	JUN 2, 1987	155:07:34:00.010	34 40.4192	113 5.4985	1000	BEHM MESA (7.5')
22	33	JUN 2, 1987	155:07:36:00.012	35 23.5544	112 14.1611	4000	WILLIAMS (7.5')
23	36	JUN 2, 1987	155:07:38:00.007	34 30.7097	113 15.5742	500	GRAYBACK MTN (7.5')
24	7	JUN 2, 1987	155:10:00:00.010	34 41.4067	113 56.3967	2000	
25	23	JUN 2, 1987	155:10:01:59.955	33 57.5299	113 59.7930	3000	BOUSE NE (ORTHO)
26	32	JUN 2, 1987	155:10:04:00.010	35 4.9451	112 37.3511	3000	PICACHO BUTTE SE (7.5')
27	28	JUN 2, 1987	155:10:06:00.007	34 27.8904	113 20.7471	1000	ARAISTRA MTN NE (7.5')

APPENDIX B

U.S.G.S. Seismic Station Locations

PACE 1987

Location number	Latitude (deg,min,sec)	Longitude (deg,min,sec)	Elev (ft)	Location number	Latitude (deg,min,sec)	Longitude (deg,min,sec)	Elev (ft)	Location number	Latitude (deg,min,sec)	Longitude (deg,min,sec)	Elev (ft)
7	34 41 24.4	113 56 23.8	2800	132	33 48 22.0	114 5 3.6	1480	182	34 5 31.0	113 51 57.3	1530
20	33 29 9.6	114 35 48.0	250	133	33 48 41.0	114 4 40.0	1440	183	34 5 36.9	113 51 51.4	1535
21	33 40 58.5	114 16 42.5	1060	134	33 48 50.9	114 4 10.7	1420	184	34 5 58.1	113 51 37.8	1600
22	33 48 55.4	114 3 58.1	1420	135	33 49 2.9	114 3 44.9	1390	185	34 6 12.0	113 51 12.9	1600
23	33 57 31.8	113 59 47.6	1000	136	33 49 26.3	114 3 30.3	1340	186	34 6 28.8	113 50 50.5	1620
24	34 5 31.8	113 51 58.2	1560	137	33 49 48.3	114 3 14.7	1300	187	34 6 44.6	113 50 28.2	1640
25	34 11 21.6	113 45 18.7	1200	138	33 50 12.9	114 3 5.6	1260	188	34 7 0.4	113 50 3.7	1680
26	34 16 17.6	113 37 57.7	1510	139	33 50 36.2	114 2 51.9	1235	189	34 7 15.8	113 49 39.1	1670
27	34 18 40.8	113 34 17.8	1580	140	33 51 3.7	114 2 41.8	1200	190	34 7 33.9	113 49 20.5	1560
28	34 27 53.4	113 20 44.8	3040	141	33 51 26.1	114 2 27.3	1180	191	34 7 51.6	113 49 4.1	1520
29	34 32 22.3	113 13 33.5	3640	142	33 51 47.9	114 2 12.3	1150	192	34 8 13.2	113 48 46.2	1495
30	34 40 25.2	113 5 29.9	5020	143	33 52 12.2	114 2 1.2	1120	193	34 8 26.1	113 48 21.4	1440
31	34 48 27.0	112 53 42.9	5845	144	33 52 36.0	114 1 49.3	1100	194	34 8 41.4	113 47 58.7	1350
32	35 4 56.7	112 37 21.1	5020	145	33 53 10.4	114 1 47.2	1060	195	34 8 59.7	113 47 40.8	1350
33	35 23 33.3	112 14 9.7	6200	146	33 53 54.1	114 1 57.0	1060	196	34 9 21.8	113 47 26.3	1350
34	35 39 13.0	111 51 34.1	6470	147	33 54 19.7	114 1 47.8	1040	197	34 9 42.4	113 47 7.7	1350
35	33 45 12.7	114 11 43.0	890	148	33 54 45.7	114 1 34.9	1005	198	34 10 6.4	113 46 53.7	1280
36	34 30 42.6	113 15 34.5	3180	149	33 55 12.0	114 1 26.0	980	199	34 10 13.4	113 46 21.6	1300
37	33 28 8.8	113 1 19.4	1280	150	33 55 37.2	114 1 16.1	960	200	34 10 30.2	113 45 0.9	1270
101	33 40 57.2	114 16 43.2	1050	151	33 56 7.6	114 1 10.1	940	201	34 10 54.3	113 45 49.8	1220
102	33 41 11.1	114 16 23.4	1000	152	33 56 21.6	114 0 51.4	900	202	34 11 8.8	113 45 22.0	1200
103	33 41 33.4	114 16 9.6	950	153	33 56 39.4	114 0 22.6	940	203	34 11 20.3	113 45 18.4	1200
104	33 41 49.6	114 15 45.2	900	154	33 57 4.4	114 0 13.2	970	204	34 11 21.4	113 44 57.5	1200
105	33 42 7.3	114 15 25.5	875	155	33 57 25.9	113 59 59.0	960	205	34 11 28.5	113 44 24.1	1160
106	33 42 19.7	114 14 59.1	830	156	33 57 30.9	113 59 48.2	1000	206	34 12 2.2	113 44 25.5	1180
107	33 42 41.0	114 14 43.3	800	157	33 57 49.6	113 59 45.5	985	207	34 12 10.7	113 44 1.4	1120
108	33 43 9.5	114 14 36.7	780	158	33 58 29.3	113 59 50.7	985	208	34 12 34.7	113 43 41.9	1260
109	33 43 23.2	114 14 10.3	790	159	33 58 44.3	113 59 35.9	1015	209	34 12 47.1	113 43 21.4	1240
110	33 43 44.7	114 13 52.5	790	160	33 59 3.3	113 59 18.6	1047	210	34 12 50.6	113 42 58.6	1170
111	33 43 59.6	114 13 30.9	800	161	33 59 25.4	113 59 1.8	1060	211	34 13 19.4	113 42 31.8	1120
112	33 44 17.0	114 13 11.3	820	162	33 59 45.0	113 58 38.3	1095	212	34 13 34.0	113 42 14.0	1270
113	33 44 38.7	114 13 0.1	825	163	33 59 56.5	113 58 16.1	1105	213	34 14 1.7	113 41 48.8	1460
114	33 44 58.2	114 12 37.5	840	164	34 0 13.3	113 57 51.5	1120	214	34 14 7.7	113 41 29.5	1360
115	33 45 6.8	114 12 9.2	850	165	34 0 25.5	113 57 19.9	1160	215	34 14 18.3	113 40 53.8	2180
116	33 45 11.6	114 11 42.9	880	166	34 0 40.4	113 56 56.3	1180	216	34 14 25.8	113 40 29.5	2200
117	33 45 15.1	114 11 19.5	900	167	34 0 53.3	113 56 31.9	1210	217	34 14 50.6	113 40 13.6	2080
118	33 45 23.7	114 10 58.8	930	168	34 1 7.4	113 56 7.9	1220	218	34 15 6.2	113 39 46.8	1920
119	33 45 35.9	114 10 35.1	950	169	34 1 24.0	113 55 46.3	1240	219	34 15 19.3	113 39 24.5	1910
120	33 45 54.3	114 10 13.4	980	170	34 1 40.0	113 55 23.6	1260	220	34 15 35.9	113 38 56.3	1770
121	33 46 2.5	114 9 45.0	1000	171	34 1 56.7	113 55 2.6	1290	221	34 15 41.8	113 38 30.1	1680
122	33 46 9.9	114 9 14.1	1020	172	34 2 16.3	113 54 44.1	1320	222	34 16 2.7	113 38 11.0	1840
123	33 46 23.3	114 8 44.4	1050	173	34 2 34.9	113 54 26.0	1340	223	34 16 18.5	113 37 57.0	1500
124	33 46 29.9	114 8 3.8	1090	174	34 2 59.7	113 54 14.6	1380	224	34 16 24.2	113 37 31.1	1460
125	33 46 29.1	114 7 35.1	1120	175	34 3 15.9	113 53 52.4	1380	225	34 16 43.8	113 37 17.3	1420
126	33 46 35.2	114 7 0.6	1170	176	34 3 36.5	113 53 38.8	1420	226	34 17 10.4	113 37 5.4	1420
127	33 46 48.1	114 6 31.8	1190	177	34 4 1.7	113 53 23.6	1440	227	34 17 7.0	113 36 41.3	1360
128	33 46 52.4	114 5 56.9	1235	178	34 4 17.6	113 53 2.9	1460	228	34 17 5.9	113 35 57.8	1310
129	33 47 11.6	114 5 35.1	1240	179	34 4 36.4	113 52 45.8	1480	229	34 17 13.8	113 35 25.7	1300
130	33 47 31.4	114 5 21.7	1300	180	34 4 55.7	113 52 25.4	1500	230	34 17 22.1	113 34 52.5	1260
131	33 48 0.7	114 5 12.8	1400	181	34 5 15.1	113 52 7.3	1520	231	34 17 33.0	113 34 25.8	1200

U.S.G.S. Seismic Station Locations

PACE 1987

Location number	Latitude (deg,min,sec)	Longitude (deg,min,sec)	Elev (ft)	Location number	Latitude (deg,min,sec)	Longitude (deg,min,sec)	Elev (ft)	Location number	Latitude (deg,min,sec)	Longitude (deg,min,sec)	Elev (ft)
232	34 18 11.2	113 34 30.2	1290	282	34 30 5.3	113 16 16.3	3280	332	34 45 0.6	113 1 49.3	5550
233	34 18 25.9	113 34 24.1	1330	283	34 30 28.0	113 15 52.4	3400	333	34 45 17.3	113 1 29.7	5580
234	34 18 41.1	113 34 17.0	1360	284	34 30 43.1	113 15 36.0	3480	334	34 45 33.1	113 1 6.4	5580
235	34 18 50.6	113 33 58.3	1410	285	34 30 48.4	113 15 26.3	3540	335	34 45 24.1	113 0 13.9	5700
236	34 19 16.4	113 33 46.8	1980	286	34 30 57.3	113 15 15.5	3520	336	34 45 29.8	112 59 37.0	5820
237	34 19 15.4	113 33 2.7	1920	287	34 31 12.1	113 14 51.4	3520	337	34 45 39.8	112 59 6.9	5880
238	34 19 30.1	113 32 37.8	1900	288	34 31 23.1	113 14 22.8	3440	338	34 45 51.5	112 58 38.8	6000
239	34 19 50.0	113 32 33.6	2010	289	34 31 39.8	113 14 3.4	3530	339	34 46 8.7	112 58 18.3	5800
240	34 20 18.0	113 32 16.8	1370	290	34 32 6.3	113 13 53.1	3700	340	34 46 26.4	112 57 58.0	5820
241	34 20 30.6	113 31 48.7	1250	291	34 32 23.3	113 13 34.0	3620	341	34 46 46.8	112 57 40.1	5840
242	34 21 2.9	113 31 35.2	1200	292	34 32 40.5	113 13 24.8	3760	342	34 46 53.6	112 57 3.0	5900
243	34 20 59.9	113 30 57.7	1380	293	34 32 44.4	113 13 0.1	3990	343	34 47 1.4	112 56 34.3	5980
244	34 21 11.6	113 30 28.8	1440	294	34 32 46.6	113 12 35.7	4040	344	34 47 37.5	112 56 35.9	5970
245	34 21 29.2	113 30 13.2	1580	295	34 33 2.0	113 12 13.2	3870	345	34 47 31.6	112 55 47.3	5870
246	34 21 35.6	113 29 36.2	2035	296	34 33 16.5	113 11 50.2	3850	346	34 47 40.6	112 55 15.8	5890
247	34 22 0.2	113 29 19.3	2590	297	34 33 39.2	113 11 36.1	3880	347	34 47 49.2	112 54 46.7	5890
248	34 22 12.4	113 28 53.4	2160	298	34 33 52.2	113 11 10.7	3970	348	34 48 2.2	112 54 19.2	5980
249	34 22 32.3	113 28 42.3	2720	299	34 34 8.7	113 10 49.7	3890	349	34 48 18.7	112 53 56.0	5900
250	34 22 36.9	113 28 12.7	2480	300	34 34 21.5	113 10 22.6	3720	350	34 48 26.9	112 53 44.5	5850
251	34 22 59.5	113 27 48.3	2620	301	34 34 52.5	113 10 12.1	3890	351	33 48 53.7	114 3 58.4	1408
252	34 23 20.1	113 27 29.2	2730	302	34 34 57.7	113 9 45.6	3980				
253	34 23 36.2	113 27 8.7	2920	303	34 35 27.8	113 9 38.1	3940				
254	34 23 54.3	113 26 46.6	2940	304	34 35 47.0	113 9 20.2	4070				
255	34 23 59.3	113 26 14.2	3020	305	34 35 59.1	113 8 57.3	4140				
256	34 24 13.6	113 25 47.7	3180	306	34 36 20.8	113 8 38.0	4360				
257	34 24 29.7	113 25 29.4	3180	307	34 36 42.9	113 8 21.8	4320				
258	34 24 44.6	113 25 2.1	3390	308	34 37 2.2	113 8 3.9	4335				
259	34 25 3.3	113 24 47.3	3600	309	34 37 17.7	113 7 40.7	4350				
260	34 25 18.3	113 24 37.0	3990	310	34 37 31.4	113 7 17.8	4360				
261	34 25 34.3	113 24 17.8	4360	311	34 37 48.6	113 6 56.5	4430				
262	34 25 56.6	113 23 43.1	3900	312	34 37 55.9	113 6 23.3	4360				
263	34 26 11.7	113 23 26.6	3820	313	34 38 19.6	113 6 11.3	4230				
264	34 26 24.2	113 22 57.3	3360	314	34 38 40.2	113 5 54.1	4220				
265	34 26 37.6	113 22 33.6	3200	315	34 39 5.6	113 5 44.3	4410				
266	34 26 58.1	113 22 13.9	3040	316	34 39 41.6	113 5 47.3	4750				
267	34 27 14.9	113 21 53.5	3000	317	34 40 11.5	113 5 42.0	5010				
268	34 27 17.3	113 21 15.4	3050	318	34 40 24.1	113 5 30.8	5020				
269	34 27 35.2	113 20 55.1	3000	319	34 40 45.8	113 5 26.7	5120				
270	34 27 53.3	113 20 46.3	3040	320	34 40 51.8	113 5 5.8	5090				
271	34 28 0.8	113 20 37.6	3080	321	34 41 16.9	113 4 56.2	5560				
272	34 28 7.7	113 20 34.5	3110	322	34 41 37.6	113 4 38.7	5590				
273	34 28 20.4	113 20 34.6	3160	323	34 41 57.0	113 4 24.9	5560				
274	34 28 45.8	113 20 3.5	3280	324	34 42 19.0	113 3 56.9	5590				
275	34 28 54.5	113 19 44.6	3350	325	34 42 45.3	113 3 31.6	5470				
276	34 29 1.5	113 19 11.2	3440	326	34 42 59.2	113 3 2.1	5460				
277	34 29 11.7	113 18 41.9	3440	327	34 43 7.6	113 2 41.2	5460				
278	34 29 5.9	113 17 51.8	3280	328	34 43 25.9	113 2 24.0	5550				
279	34 29 5.4	113 17 10.5	3180	329	34 43 45.8	113 2 24.0	5620				
280	34 29 25.6	113 16 54.2	3115	330	34 44 8.9	113 2 10.5	5620				
281	34 29 51.0	113 16 37.0	3220	331	34 44 36.7	113 2 0.7	5540				

APPENDIX C

Field Data Tables

Field data tables include information related to the seismic recorders. Each table contains shot number, shotpoint number and shot time given in Julian day, hour, minutes and seconds. Column headings for the table are explained below:

Loc	- location number from the seismic recorder location (see Appendix B).
Dist	- distance in kilometers from the shotpoint to the recorder (km).
Azim	- azimuth from the shotpoint to the recorder (degrees clockwise from north).
Db	- attenuation of preferred recording channel (db). The gain of this channel is determined by subtracting the given attenuation from a total gain of 96 db.
Tape Grade	- number corresponding to the performance of each instrument.

Tape Grade Scale

Scale is a listing of all tape grade numbers used on the Field Data Tables. Each number corresponds to the performance of each recording unit.

0	= Tape ran normally and recorded useful data.
1	= Tape did not run.
2	= Tape ran; no signal recorded; digital counts are less than 100.
3	= Bad time code; data not retrievable.
4	= Skipped record time; tape did not run during this shot.
5	= Instrument not deployed.
6	= Clipped trace; digital counts greater than 1600.
7	= High noise; trace deleted.
8	= Timing error; trace must be shifted.
9	= Partial record; less than 20 seconds digitized.
10	= Low record level; data not retrievable.
11	= Station location unavailable.

PACE 1987

Shot Number 1 Shot Point 37

Shot Time (Julian day, hr, min, sec): 152:05:00:00.007

Loc	Dist (km)	Azim (deg)	Tape Db Grade	Loc	Dist (km)	Azim (deg)	Tape Db Grade	Loc	Dist (km)	Azim (deg)	Tape Db Grade
101	119.04	281.8	12 0	141	103.84	294.8	12 0	181	104.19	311.4	12 0
102	118.63	282.1	12 0	142	103.77	295.2	12 0	182	104.31	311.7	12 3
103	118.42	282.4	12 0	143	103.82	295.6	12 0	183	104.32	311.8	12 0
104	117.90	282.7	1 0	144	103.86	296.1	12 0	184	104.49	312.2	12 0
105	117.52	283.0	12 0	145	104.27	296.6	12 0	185	104.30	312.6	12 0
106	116.94	283.3	12 0	146	105.10	297.2	12 0	186	104.23	313.1	12 0
107	116.69	283.7	12 0	147	105.24	297.7	12 0	187	104.14	313.5	4
108	116.72	284.1	30 0	148	105.32	298.1	12 0	188	104.02	313.9	12 0
109	116.16	284.4	30 0	149	105.49	298.6	12 0	189	103.89	314.3	12 0
110	115.88	284.7	30 0	150	105.64	299.0	12 0	190	103.94	314.7	10
111	115.45	285.0	12 0	151	105.95	299.5	12 0	191	104.02	315.1	12 0
112	115.09	285.4	12 0	152	105.74	299.8	12 0	192	104.16	315.6	12 0
113	114.99	285.7	12 0	153	105.37	300.3	12 0	193	104.00	316.0	12 0
114	114.59	286.1	12 0	154	105.54	300.7	12 0	194	103.93	316.4	1
115	113.96	286.3	1 0	155	105.56	301.1	12 0	195	104.02	316.8	12 0
116	113.35	286.5	12 0	156	105.40	301.3	12 0	196	104.26	317.2	12 0
117	112.79	286.6	12 0	157	105.64	301.6	12 0	197	104.40	317.6	4
118	112.36	286.8	12 0	158	106.39	302.1	30 0	198	104.70	318.0	12 0
119	111.88	287.1	12 0	159	106.31	302.4	12 0	199	104.31	318.4	12 0
120	111.50	287.4	1 0	160	106.24	302.8	4	200	104.34	318.8	4
121	110.88	287.7	12 0	161	106.24	303.2	12 0	201	104.71	319.2	12 0
122	110.18	287.9	1 0	162	106.07	303.7	12 0	202	104.58	319.7	12 0
123	109.58	288.2	12 0	163	105.79	304.0	30 0	203	104.79	319.8	12 0
124	108.56	288.4	12 0	164	105.55	304.4	12 0	204	104.47	320.1	12 0
125	107.94	288.6	12 0	165	105.09	304.9	12 0	205	104.08	320.5	12 0
126	107.15	288.9	12 0	166	104.85	305.3	12 0	206	104.90	320.9	12 0
127	106.57	289.2	12 0	167	104.56	305.6	12 0	207	104.71	321.2	12 0
128	105.77	289.4	12 0	168	104.31	306.0	3	208	104.97	321.7	12 0
129	105.43	289.8	12 0	169	104.16	306.4	12 0	209	104.95	322.0	12 0
130	105.31	290.2	30 0	170	103.98	306.8	12 0	210	104.67	322.3	12 0
131	105.40	290.7	12 0	171	103.85	307.2	12 0	211	104.95	322.9	12 0
132	105.40	291.1	12 0	172	103.84	307.7	12 0	212	105.03	323.3	12 0
133	105.04	291.5	1 0	173	103.81	308.1	12 0	213	105.33	323.8	12 0
134	104.45	291.8	12 0	174	104.05	308.5	12 0	214	105.19	324.1	10
135	103.97	292.1	30 0	175	103.92	308.9	12 0	215	104.91	324.6	12 0
136	103.88	292.6	12 0	176	104.04	309.3	12 0	216	104.74	325.0	12 0
137	103.77	293.0	12 0	177	104.22	309.8	12 0	217	105.13	325.4	12 0
138	103.84	293.4	12 0	178	104.12	310.2	12 0	218	105.14	325.8	12 0
139	103.80	293.9	12 0	179	104.16	310.6	12 0	219	105.14	326.2	12 0
140	103.90	294.3	12 0	180	104.15	311.0	30 0	220	105.17	326.7	12 0

PACE 1987

Shot Number 2 Shot Point 34

Shot Time (Julian day, hr, min, sec): 152:05:02:00.012

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
101	311.39	226.1	12	2	141	282.13	225.7	12	2	181	252.84	227.2	12	0
102	310.73	226.1	12	0	142	281.38	225.7	12	2	182	252.31	227.2	12	0
103	309.99	226.1	12	0	143	280.65	225.8	12	2	183	252.08	227.2	12	0
104	309.19	226.1		1	144	279.91	225.9	12	0	184	251.37	227.3	12	0
105	308.45	226.1	12	0	145	279.12	226.0	12	2	185	250.62	227.2	12	0
106	307.70	226.1	12	0	146	278.34	226.2	12	0	186	249.85	227.2	12	0
107	306.94	226.1	12	0	147	277.62	226.3	12	2	187	249.10	227.2		4
108	306.20	226.2	12	2	148	276.82	226.4	12	2	188	248.31	227.2	12	0
109	305.42	226.2	12	0	149	276.08	226.5	12	2	189	247.52	227.2	12	0
110	304.63	226.2	12	2	150	275.36	226.5	12	2	190	246.79	227.2		10
111	303.91	226.2	12	0	151	274.59	226.7	12	2	191	246.11	227.2	12	0
112	303.18	226.2	12	0	152	273.94	226.7	12	2	192	245.32	227.3	12	0
113	302.50	226.2	12	0	153	273.03	226.6	12	0	193	244.59	227.2	12	0
114	301.66	226.2	12	0	154	272.32	226.7	12	2	194	243.84	227.2		1
115	300.96	226.2		1	155	271.59	226.8	12	2	195	243.12	227.2	12	0
116	300.38	226.1	12	0	156	271.29	226.7	12	2	196	242.38	227.3	12	0
117	299.88	226.0	12	0	157	270.83	226.8	12	0	197	241.59	227.3		4
118	299.32	226.0	12	0	158	270.08	227.0	12	2	198	240.83	227.4	12	0
119	298.62	226.0	12	0	159	269.48	227.0	12	2	199	240.08	227.3	12	0
120	297.82	226.0		1	160	268.75	227.1		4	200	239.34	227.3		4
121	297.13	225.9	12	0	161	267.97	227.1	12	2	201	238.62	227.4	12	2
122	296.41	225.8		1	162	267.12	227.1	12	2	202	237.80	227.3	12	0
123	295.58	225.8	12	0	163	266.46	227.1	12	2	203	237.49	227.4	12	2
124	294.90	225.6	12	0	164	265.65	227.1	12	2	204	237.08	227.3	12	2
125	294.21	225.5	12	0	165	264.81	227.0	12	2	205	236.31	227.2	12	2
126	293.45	225.4	12	0	166	264.05	227.0	12	2	206	235.62	227.4	12	2
127	292.65	225.4	12	0	167	263.32	226.9	12	2	207	234.99	227.3	12	2
128	291.93	225.3	12	2	168	262.58	226.9		3	208	234.12	227.4	12	2
129	291.11	225.3	12	0	169	261.83	226.9	12	2	209	233.47	227.3	12	2
130	290.44	225.3	12	0	170	261.07	226.9	12	2	210	232.98	227.3	12	2
131	289.63	225.4	12	0	171	260.32	226.9	12	2	211	231.87	227.3	12	2
132	289.00	225.5	12	0	172	259.56	226.9	12	2	212	231.23	227.3	12	2
133	288.15	225.5	12	0	173	258.83	226.9	12	2	213	230.17	227.3	12	2
134	287.41	225.4	12	0	174	258.08	227.0	12	2	214	229.69	227.3		10
135	286.68	225.4	12	0	175	257.33	227.0	12	2	215	228.80	227.2	12	0
136	285.90	225.4	12	0	176	256.64	227.1	12	2	216	228.19	227.1	12	2
137	285.14	225.4	12	0	177	255.82	227.1	12	2	217	227.37	227.2	12	2
138	284.43	225.5	12	0	178	255.09	227.1	12	2	218	226.54	227.2	12	2
139	283.67	225.6	12	0	179	254.38	227.1	12	2	219	225.85	227.1	12	2
140	282.88	225.6	12	0	180	253.59	227.2	12	2	220	224.98	227.1	12	2

PACE 1987

Shot Number 3 Shot Point 31

Shot Time (Julian day, hr, min, sec): 152:05:04:00.013

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
101	178.35	226.0	12	0	141	149.08	225.3	12	0	181	119.92	228.5	30	0
102	177.69	226.0	12	0	142	148.33	225.4	30	0	182	119.40	228.6	30	0
103	176.96	226.1	12	0	143	147.60	225.5	12	0	183	119.17	228.6	30	0
104	176.16	226.0		1	144	146.86	225.6	12	2	184	118.47	228.7	12	0
105	175.41	226.0	12	0	145	146.08	225.9	30	0	185	117.71	228.7	30	0
106	174.66	226.0	12	0	146	145.32	226.4	30	0	186	116.94	228.7	12	0
107	173.91	226.0	12	0	147	144.60	226.5	30	0	187	116.19	228.7		4
108	173.17	226.2	12	2	148	143.80	226.7	12	0	188	115.40	228.7	12	0
109	172.39	226.1	12	0	149	143.07	226.8	12	0	189	114.61	228.6	12	0
110	171.60	226.2	12	0	150	142.36	227.0	12	0	190	113.88	228.7		10
111	170.88	226.2	12	0	151	141.60	227.2	12	0	191	113.20	228.7	30	0
112	170.15	226.2	12	0	152	140.95	227.2	30	0	192	112.42	228.8	30	0
113	169.47	226.3	30	2	153	140.04	227.2	30	0	193	111.68	228.8	30	0
114	168.63	226.3	12	0	154	139.33	227.3	30	0	194	110.93	228.8		1
115	167.93	226.2		1	155	138.61	227.4	30	0	195	110.21	228.8	12	0
116	167.35	226.0	12	0	156	138.31	227.4	12	0	196	109.49	229.0	30	0
117	166.84	225.9	12	0	157	137.86	227.6	30	0	197	108.71	229.0		4
118	166.28	225.9	12	0	158	137.13	228.0	12	0	198	107.95	229.2	30	0
119	165.58	225.8	12	0	159	136.54	228.0	30	0	199	107.19	229.0	30	0
120	164.78	225.8		1	160	135.81	228.1		4	200	106.45	229.0		4
121	164.09	225.7	30	0	161	135.04	228.1	30	0	201	105.75	229.2	30	0
122	163.37	225.5		1	162	134.18	228.2	30	0	202	104.92	229.1	30	0
123	162.54	225.4	12	0	163	133.52	228.1	12	0	203	104.61	229.3	30	0
124	161.85	225.2	12	0	164	132.71	228.1	30	0	204	104.19	229.1	30	0
125	161.16	225.0	12	0	165	131.85	228.0	30	0	205	103.40	228.9	30	0
126	160.40	224.9	12	0	166	131.10	227.9	30	0	206	102.74	229.3	30	0
127	159.60	224.8	12	0	167	130.37	227.9	30	0	207	102.11	229.2	30	0
128	158.88	224.6	12	2	168	129.62	227.8		3	208	101.24	229.3	30	0
129	158.07	224.6	12	0	169	128.87	227.8	12	0	209	100.60	229.3	30	0
130	157.39	224.6	30	0	170	128.11	227.8	30	0	210	100.09	229.1	30	0
131	156.58	224.8	12	0	171	127.36	227.8	30	0	211	98.99	229.2	30	0
132	155.95	224.9	12	0	172	126.60	227.9	30	0	212	98.35	229.3	12	0
133	155.10	224.9	12	0	173	125.87	227.9	30	0	213	97.30	229.4	30	0
134	154.36	224.8	12	0	174	125.14	228.1	12	0	214	96.81	229.3		10
135	153.63	224.7	12	0	175	124.38	228.1	30	0	215	95.91	229.1	30	0
136	152.85	224.8	12	0	176	123.70	228.2	30	0	216	95.29	228.9	30	0
137	152.09	224.9	12	0	177	122.89	228.3	30	0	217	94.48	229.1	30	0
138	151.38	225.0	12	0	178	122.16	228.3	12	0	218	93.64	229.0	30	0
139	150.62	225.1	12	0	179	121.45	228.4	30	0	219	92.95	229.0	30	0
140	149.83	225.2	30	0	180	120.67	228.5	30	0	220	92.07	228.9	12	0

PACE 1987

Shot Number 4 Shot Point 20

Shot Time (Julian day, hr, min, sec): 152:05:06:00.008

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
101	36.70	53.5	12	0	141	65.97	51.2	12	0	181	94.85	45.1	12	0
102	37.36	53.4	12	0	142	66.69	51.0	12	0	182	95.38	45.0	12	0
103	38.06	52.9	12	0	143	67.38	50.6	12	0	183	95.61	45.0	12	0
104	38.86	52.9		1	144	68.08	50.3	12	2	184	96.32	44.9	12	0
105	39.59	52.7	12	0	145	68.80	49.7	12	0	185	97.08	44.9	12	0
106	40.36	52.8	12	0	146	69.48	48.7	12	0	186	97.85	45.0	12	0
107	41.09	52.4	12	0	147	70.18	48.3	12	0	187	98.60	45.0		9
108	41.76	51.6	88	6	148	70.96	48.0	12	0	188	99.38	45.0	12	0
109	42.55	51.7	12	0	149	71.67	47.6	12	0	189	100.17	45.1	12	0
110	43.32	51.4	12	0	150	72.38	47.3	12	0	190	100.90	45.1		1
111	44.04	51.4	12	0	151	73.13	46.9	12	0	191	101.58	45.0	12	0
112	44.77	51.3	12	0	152	73.77	46.9	12	0	192	102.37	44.9	12	0
113	45.41	50.8	12	0	153	74.69	46.9	12	0	193	103.10	45.0	12	0
114	46.25	50.7	12	0	154	75.39	46.6	12	0	194	103.85	45.1		1
115	46.98	51.0		1	155	76.11	46.5	12	0	195	104.57	45.0	12	2
116	47.60	51.4	12	0	156	76.42	46.5	12	0	196	105.32	44.9	12	0
117	48.14	51.7	12	0	157	76.86	46.2	12	0	197	106.10	44.8		4
118	48.72	51.9	12	0	158	77.61	45.5	12	0	198	106.88	44.7	12	0
119	49.44	52.0	12	0	159	78.20	45.5	12	0	199	107.61	44.9	12	0
120	50.23	51.8		1	160	78.93	45.4		4	200	108.35	44.9		4
121	50.96	52.1	12	0	161	79.72	45.3	12	0	201	109.08	44.7	12	0
122	51.73	52.5		1	162	80.57	45.3	12	0	202	109.90	44.8	12	0
123	52.58	52.6	12	0	163	81.22	45.4	12	2	203	110.21	44.7	12	0
124	53.38	53.3	12	0	164	82.04	45.4	12	0	204	110.62	44.9	12	0
125	54.12	53.6	12	0	165	82.88	45.6	12	0	205	111.38	45.1	12	0
126	54.95	54.0	12	0	166	83.64	45.7	12	0	206	112.08	44.8	12	0
127	55.79	54.1	12	0	167	84.36	45.8	12	0	207	112.71	44.9	12	0
128	56.59	54.5	12	2	168	85.11	45.8		3	208	113.58	44.8	12	0
129	57.39	54.4	12	0	169	85.86	45.9	12	0	209	114.22	44.8	12	0
130	58.03	54.1	12	0	170	86.62	45.9	12	0	210	114.71	45.0	12	0
131	58.74	53.5	12	0	171	87.37	45.9	12	0	211	115.82	44.9	12	0
132	59.32	53.1	12	0	172	88.13	45.8	12	0	212	116.47	44.9	12	0
133	60.16	53.0	12	0	173	88.86	45.8	12	0	213	117.52	44.9	12	0
134	60.95	53.2	12	0	174	89.60	45.5	12	0	214	118.01	45.0		
135	61.70	53.3	12	0	175	90.36	45.6	12	0	215	118.88	45.2	12	0
136	62.43	53.0	12	0	176	91.05	45.4	12	0	216	119.49	45.3	12	0
137	63.16	52.7	12	0	177	91.87	45.2	12	0	217	120.32	45.2	12	0
138	63.80	52.3	12	0	178	92.59	45.3	12	0	218	121.14	45.2	12	0
139	64.52	51.9	12	0	179	93.31	45.2	12	0	219	121.83	45.3	12	0
140	65.25	51.5	12	0	180	94.10	45.2	12	0	220	122.71	45.3	12	0

PACE 1987

Shot Number 5 Shot Point 26

Shot Time (Julian day, hr, min, sec): 152:05:08:00.015

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
101	88.50	222.6	12	0	141	59.43	219.5	12	0	181	29.83	226.9	30	0
102	87.84	222.5	12	0	142	58.67	219.6	12	0	182	29.31	227.2	12	0
103	87.09	222.7	12	0	143	57.91	219.8	12	0	183	29.08	227.3	30	0
104	86.30	222.6		1	144	57.15	220.1	12	8	184	28.38	227.8	12	0
105	85.55	222.6	12	0	145	56.30	220.7	12	0	185	27.62	227.6	30	0
106	84.81	222.4	12	0	146	55.45	221.8	12	0	186	26.85	227.5	12	0
107	84.05	222.5	12	0	147	54.71	222.2	12	0	187	26.10	227.5		9
108	83.29	222.8	30	0	148	53.89	222.5	12	0	188	25.30	227.3	12	0
109	82.52	222.7	12	0	149	53.14	222.9	12	0	189	24.52	227.1	30	0
110	81.72	222.8	30	0	150	52.40	223.3	12	0	190	23.79	227.3		1
111	81.01	222.7	12	0	151	51.61	223.9	12	0	191	23.11	227.6	30	0
112	80.27	222.7	12	0	152	50.97	223.8	12	0	192	22.33	228.1	88	6
113	79.58	222.8	12	0	153	50.06	223.6	12	0	193	21.59	227.7	30	0
114	78.75	222.8	12	0	154	49.34	224.0	12	0	194	20.84	227.6		1
115	78.06	222.6		1	155	48.61	224.3	12	0	195	20.12	227.9	12	2
116	77.50	222.3	12	0	156	48.30	224.2	12	0	196	19.39	228.7	30	0
117	77.01	222.0	12	0	157	47.84	224.6	12	0	197	18.61	229.2		4
118	76.46	221.8	12	0	158	47.07	225.7	12	0	198	17.86	230.2	30	0
119	75.78	221.7	12	0	159	46.47	225.8	12	0	199	17.10	229.0	30	0
120	74.98	221.6		1	160	45.75	225.9		4	200	16.36	229.2		4
121	74.31	221.3	12	0	161	44.96	226.2	12	0	201	15.66	230.5	30	0
122	73.62	221.0		1	162	44.11	226.2	12	0	202	14.83	230.1	30	0
123	72.81	220.7	12	0	163	43.45	226.0	12	2	203	14.53	231.0	30	0
124	72.19	220.1	12	0	164	42.64	225.9	88	2	204	14.10	229.7	30	0
125	71.53	219.7	12	0	165	41.80	225.5	12	0	205	13.31	228.0	30	0
126	70.82	219.3	12	0	166	41.05	225.4	12	0	206	12.67	231.6	30	0
127	70.04	219.0	12	0	167	40.32	225.2	12	0	207	12.02	230.8	30	0
128	69.38	218.5	12	2	168	39.58	225.0		3	208	11.17	232.1	30	0
129	68.57	218.5	12	0	169	38.83	224.9	12	0	209	10.52	232.0	30	0
130	67.88	218.5	12	0	170	38.07	224.8	12	0	210	10.00	230.4	30	0
131	67.03	218.9	12	0	171	37.32	224.8	12	0	211	8.91	232.0	48	0
132	66.37	219.1	12	0	172	36.56	224.9	12	0	212	8.27	232.5	30	0
133	65.53	219.0	12	0	173	35.83	225.0	12	90	213	7.25	234.7	48	0
134	64.82	218.6	12	0	174	35.08	225.6	30	6	214	6.74	233.6		10
135	64.12	218.4	12	0	175	34.32	225.5	12	0	215	5.82	230.8	48	0
136	63.32	218.5	12	0	176	33.63	225.9	30	0	216	5.19	228.4	48	0
137	62.54	218.6	12	0	177	32.81	226.4	12	0	217	4.39	232.4	30	6
138	61.81	218.9	12	0	178	32.09	226.3	12	0	218	3.55	231.8	68	0
139	61.02	219.0	12	0	179	31.37	226.5	30	0	219	2.86	231.0	30	6
140	60.20	219.3	12	0	180	30.58	226.7	30	0	220	1.97	229.4	30	6

PACE 1987

Shot Number 6 Shot Point 33

Shot Time (Julian day, hr, min, sec): 152:08:02:00.010

Loc	Dist (km)	Azim (deg)	Tape Db Grade	Loc	Dist (km)	Azim (deg)	Tape Db Grade	Loc	Dist (km)	Azim (deg)	Tape Db Grade
101	266.72	225.3	12 0	141	237.49	224.7	12 2	181	208.12	226.4	12 2
102	266.06	225.2	12 0	142	236.73	224.7	12 0	182	207.59	226.4	12 2
103	265.31	225.3	12 0	143	235.99	224.8	12 0	183	207.35	226.4	12 2
104	264.52	225.3	1	144	235.25	224.9	12 2	184	206.65	226.5	12 2
105	263.77	225.3	12 0	145	234.45	225.1	12 2	185	205.89	226.5	12 2
106	263.03	225.2	12 0	146	233.66	225.3	12 2	186	205.12	226.5	12 2
107	262.27	225.3	12 0	147	232.93	225.4	12 0	187	204.37	226.4	9
108	261.52	225.4	5	148	232.13	225.5	12 2	188	203.58	226.4	12 2
109	260.75	225.3	12 0	149	231.39	225.6	12 2	189	202.80	226.4	12 2
110	259.95	225.3	12 0	150	230.66	225.7	12 0	190	202.07	226.4	1
111	259.24	225.3	12 0	151	229.89	225.8	12 0	191	201.39	226.4	12 2
112	258.50	225.3	12 0	152	229.24	225.8	12 0	192	200.59	226.5	12 2
113	257.82	225.4	12 0	153	228.33	225.8	12 0	193	199.86	226.4	12 2
114	256.98	225.4	12 0	154	227.62	225.9	12 2	194	199.12	226.4	1
115	256.29	225.3	1	155	226.89	225.9	12 2	195	198.39	226.4	12 0
116	255.71	225.2	4	156	226.58	225.9	12 2	196	197.65	226.5	12 2
117	255.21	225.2	12 0	157	226.13	226.0	12 0	197	196.87	226.5	4
118	254.65	225.1	12 0	158	225.36	226.2	12 2	198	196.09	226.6	12 2
119	253.96	225.1	12 0	159	224.76	226.3	12 0	199	195.36	226.5	12 2
120	253.16	225.1	1	160	224.04	226.3	4	200	194.61	226.5	12 2
121	252.47	225.0	12 0	161	223.25	226.3	12 2	201	193.89	226.6	12 2
122	251.76	224.9	3	162	222.40	226.3	12 0	202	193.07	226.5	12 2
123	250.93	224.8	12 0	163	221.74	226.3	12 0	203	192.76	226.6	12 0
124	250.26	224.6	12 0	164	220.93	226.3	12 2	204	192.35	226.5	12 0
125	249.57	224.6	12 2	165	220.09	226.2	12 0	205	191.59	226.4	12 2
126	248.82	224.4	3	166	219.34	226.2	12 2	206	190.89	226.6	12 0
127	248.03	224.4	12 0	167	218.61	226.1	12 2	207	190.26	226.5	12 0
128	247.32	224.3	12 2	168	217.87	226.1	3	208	189.39	226.6	12 2
129	246.50	224.3	12 0	169	217.12	226.1	12 0	209	188.74	226.5	12 0
130	245.82	224.3	12 0	170	216.36	226.1	12 2	210	188.25	226.4	12 2
131	245.00	224.4	12 0	171	215.61	226.1	12 2	211	187.14	226.5	12 2
132	244.37	224.5	12 2	172	214.85	226.1	12 2	212	186.50	226.5	12 2
133	243.52	224.5	12 2	173	214.12	226.1	12 2	213	185.44	226.5	12 2
134	242.78	224.4	12 2	174	213.37	226.2	12 2	214	184.96	226.5	10
135	242.06	224.3	12 2	175	212.61	226.2	12 2	215	184.08	226.3	30 0
136	241.28	224.4	12 2	176	211.92	226.2	12 0	216	183.47	226.3	12 2
137	240.51	224.4	12 2	177	211.10	226.3	12 2	217	182.65	226.3	12 2
138	239.80	224.5	12 2	178	210.37	226.3	12 2	218	181.82	226.3	12 2
139	239.03	224.6	12 2	179	209.66	226.3	12 2	219	181.13	226.3	12 2
140	238.24	224.6	12 2	180	208.87	226.4	12 2	220	180.26	226.2	12 2

PACE 1987

Shot Number 7 Shot Point 22

Shot Time (Julian day, hr, min, sec): 152:08:04:00.007

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
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101	24.59	233.3	12	0	141	5.20	26.7	48	0	181	35.28	31.1	12	0
102	23.93	233.3	12	0	142	5.97	27.1	48	0	182	35.83	31.0	12	0
103	23.24	234.2	12	0	143	6.77	26.3	48	0	183	36.06	31.1	12	0
104	22.43	234.3		1	144	7.56	25.9	12	2	184	36.80	31.0	12	0
105	21.70	234.7	12	0	145	8.55	23.2	30	0	185	37.50	31.5	12	0
106	20.93	234.4	12	0	146	9.72	18.7	30	0	186	38.24	31.9	12	0
107	20.22	235.3	30	0	147	10.54	18.5	30	0	187	38.96	32.2		4
108	19.58	237.1		5	148	11.40	18.8	30	0	188	39.70	32.6	12	0
109	18.79	237.0	30	0	149	12.25	18.6	30	0	189	40.45	33.0	12	0
110	18.04	238.0	30	0	150	13.06	18.6	30	0	190	41.18	33.1		1
111	17.33	238.3	12	2	151	14.00	17.9	30	0	191	41.86	33.2	12	0
112	16.62	239.0	30	0	152	14.56	19.2	30	0	192	42.67	33.2	12	0
113	16.03	240.5	30	0	153	15.33	21.1	30	0	193	43.35	33.6	12	0
114	15.23	241.4	30	0	154	16.14	21.0	30	0	194	44.07	33.9		1
115	14.46	240.9		1	155	16.89	21.3	30	0	195	44.79	34.0	12	2
116	13.80	240.1		4	156	17.13	22.0	30	0	196	45.56	33.9	12	0
117	13.23	239.2	30	0	157	17.70	21.5	30	0	197	46.36	33.9		4
118	12.64	239.0	30	8	158	18.79	19.8	12	0	198	47.17	33.8	12	0
119	11.92	239.0	30	0	159	19.36	20.3	30	0	199	47.81	34.5	12	0
120	11.15	240.0		1	160	20.06	21.0		4	200	48.54	34.6	12	0
121	10.39	239.2	30	0	161	20.85	21.4	12	0	201	49.31	34.4	12	0
122	9.60	237.9		1	162	21.64	22.3	12	0	202	50.08	34.8	12	0
123	8.73	237.6	48	0	163	22.19	23.3	12	0	203	50.43	34.6	12	0
124	7.91	233.0	48	0	164	22.91	24.2	12	2	204	50.76	35.1	12	0
125	7.17	231.1	12	0	165	23.60	25.7	30	0	205	51.44	35.8	12	0
126	6.38	227.4		3	166	24.28	26.5	30	0	206	52.26	35.1	12	0
127	5.57	225.2	48	0	167	24.92	27.4	30	0	207	52.83	35.4	12	0
128	4.87	218.9	12	2	168	25.58	28.1		3	208	53.72	35.4	12	0
129	4.05	218.0	48	0	169	26.30	28.7	12	0	209	54.34	35.6	12	0
130	3.37	219.7	48	0	170	27.01	29.3	12	0	210	54.77	36.1	12	0
131	2.55	228.8	68	0	171	27.73	29.7	12	0	211	55.89	36.1	12	0
132	1.97	238.6	68	0	172	28.49	29.9	12	0	212	56.53	36.2	12	0
133	1.16	247.7	12	2	173	29.21	30.2	12	0	213	57.59	36.2	12	0
134	0.35	247.0	68	6	174	30.02	29.9	12	2	214	58.04	36.5		10
135	0.41	55.3	68	6	175	30.74	30.3	12	0	215	58.85	37.0	12	0
136	1.19	36.9	68	0	176	31.47	30.3	12	0	216	59.41	37.4	12	0
137	1.97	34.4	68	0	177	32.33	30.2	12	0	217	60.26	37.2	12	0
138	2.74	29.5	68	0	178	33.02	30.6	12	0	218	61.06	37.5	12	0
139	3.54	28.7	68	0	179	33.74	30.7	12	0	219	61.73	37.6	12	0
140	4.41	26.4	30	6	180	34.52	31.0	12	0	220	62.58	37.9	12	0

PACE 1987

Shot Number 0 shot Point 21

Shot Time (Julian day, hr, min, sec): 152:08:06:00.007

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
			Db	Grade				Db	Grade				Db	Grade
101	0.05	201.4	88	6	141	29.29	48.6	30	0	181	58.75	40.1	12	0
102	0.62	51.9	88	0	142	30.03	48.2	30	0	182	59.28	40.0	12	0
103	1.37	38.2	88	0	143	30.74	47.5	30	0	183	59.52	40.0	12	0
104	2.16	43.2		1	144	31.46	46.9	12	2	184	60.25	39.8	12	0
105	2.90	43.1	30	6	145	32.23	45.5	12	0	185	60.99	40.0	12	0
106	3.65	46.8	68	0	146	33.01	43.6	12	0	186	61.75	40.1	12	0
107	4.40	44.2	68	0	147	33.75	42.9	12	0	187	62.49	40.2		4
108	5.18	38.8		5	148	34.56	42.4	12	0	188	63.27	40.4	12	0
109	5.93	41.3	48	0	149	35.32	41.8	12	0	189	64.04	40.5	12	0
110	6.74	40.5	30	6	150	36.06	41.3	12	0	190	64.77	40.5		1
111	7.45	41.5	30	6	151	36.87	40.5	30	0	191	65.46	40.5	12	0
112	8.18	41.7	30	6	152	37.51	40.6	30	0	192	66.26	40.4	12	0
113	8.88	40.2	30	6	153	38.41	40.9	12	0	193	66.98	40.6	12	0
114	9.71	40.5	30	0	154	39.15	40.5	12	0	194	67.72	40.7		1
115	10.39	42.6		1	155	39.89	40.2	12	0	195	68.45	40.7	12	2
116	10.97	44.7		4	156	40.19	40.4	12	0	196	69.20	40.5	12	0
117	11.47	46.4	30	0	157	40.67	39.9	12	0	197	70.00	40.5		4
118	12.04	47.3	30	0	158	41.53	38.7	12	0	198	70.79	40.3	12	0
119	12.75	47.9	30	0	159	42.13	38.7	12	0	199	71.49	40.7	12	0
120	13.54	47.7		1	160	42.87	38.7		4	200	72.23	40.8	12	0
121	14.26	48.9	30	0	161	43.67	38.6	12	0	201	72.98	40.6	12	0
122	15.01	50.2		1	162	44.51	38.7	12	0	202	73.78	40.7	12	0
123	15.86	50.9	30	0	163	45.15	39.0	12	0	203	74.11	40.6	12	0
124	16.64	53.3	30	0	164	45.95	39.2	12	0	204	74.48	40.9	30	0
125	17.39	54.1	12	0	165	46.76	39.6	12	0	205	75.21	41.3	12	0
126	18.22	55.3		3	166	47.50	39.9	12	0	206	75.97	40.8	12	0
127	19.06	55.5	30	0	167	48.20	40.1	12	0	207	76.57	41.0	30	0
128	19.88	56.7	12	2	168	48.93	40.3		3	208	77.46	40.9	12	0
129	20.67	56.2	30	0	169	49.68	40.4	12	0	209	78.09	41.0	12	0
130	21.30	55.3	30	0	170	50.44	40.6	12	0	210	78.56	41.3	12	0
131	22.01	53.7	12	0	171	51.18	40.7	12	0	211	79.68	41.2	12	0
132	22.59	52.7	30	0	172	51.94	40.6	12	0	212	80.32	41.2	12	0
133	23.43	52.5	12	2	173	52.68	40.6	12	0	213	81.38	41.2	12	0
134	24.21	53.0	30	0	174	53.45	40.3	12	0	214	81.85	41.4		10
135	24.96	53.2	30	0	175	54.20	40.4	12	0	215	82.70	41.7	12	0
136	25.70	52.4	30	0	176	54.91	40.3	12	0	216	83.29	41.9	12	0
137	26.43	51.8	12	0	177	55.76	40.0	12	0	217	84.13	41.7	12	0
138	27.08	50.8	12	0	178	56.47	40.1	12	0	218	84.95	41.9	12	0
139	27.81	50.2	12	0	179	57.20	40.1	12	0	219	85.63	42.0	12	0
140	28.56	49.2	12	0	180	57.99	40.1	12	0	220	86.50	42.1	12	0

PACE 1987

Shot Number 9 Shot Point 24

Shot Time (Julian day, hr, min, sec): 152:08:08:00.005

Loc	Dist (km)	Azim (deg)	Tape Db Grade	Loc	Dist (km)	Azim (deg)	Tape Db Grade	Loc	Dist (km)	Azim (deg)	Tape Db Grade
101	59.33	220.1	12 0	141	30.66	211.8	12 0	181	0.56	204.5	30 6
102	58.68	220.0	12 0	142	29.88	211.9	12 0	182	0.03	136.3	88 0
103	57.92	220.2	12 0	143	29.10	212.2	12 0	183	0.23	47.9	88 0
104	57.14	220.0	1	144	28.31	212.5	12 2	184	0.97	32.8	30 6
105	56.39	220.0	12 0	145	27.39	213.5	12 0	185	1.70	43.1	30 6
106	55.66	219.7	12 0	146	26.43	215.6	12 0	186	2.47	44.6	30 6
107	54.90	219.8	12 0	147	25.65	216.2	12 0	187	3.22	45.8	9
108	54.11	220.3	5	148	24.81	216.7	12 0	188	4.01	47.1	30 0
109	53.36	220.0	12 0	149	24.02	217.4	12 0	189	4.79	48.0	30 0
110	52.55	220.1	12 0	150	23.25	218.1	12 0	190	5.52	47.0	1
111	51.85	219.9	12 0	151	22.42	219.2	12 0	191	6.20	46.0	30 0
112	51.11	219.9	12 0	152	21.78	218.9	12 0	192	7.00	44.7	12 0
113	50.41	220.1	12 0	153	20.89	218.3	12 0	193	7.73	46.0	30 0
114	49.58	220.0	12 0	154	20.14	219.1	30 0	194	8.47	46.4	1
115	48.91	219.6	1	155	19.40	219.5	30 0	195	9.20	45.8	12 2
116	48.37	219.1	4	156	19.10	219.2	30 0	196	9.94	44.5	30 0
117	47.91	218.6	12 0	157	18.61	220.1	30 0	197	10.73	43.9	4
118	47.37	218.3	12 0	158	17.79	223.0	30 0	198	11.51	42.7	12 0
119	46.70	218.0	12 0	159	17.19	223.1	30 0	199	12.23	44.8	12 0
120	45.91	217.9	1	160	16.46	223.4	4	200	12.97	44.8	30 0
121	45.26	217.3	12 0	161	15.67	223.9	30 0	201	13.71	43.5	30 0
122	44.60	216.7	1	162	14.82	223.9	30 0	202	14.52	44.3	12 0
123	43.82	216.2	12 0	163	14.17	223.2	12 0	203	14.84	43.6	12 0
124	43.27	215.0	12 0	164	13.36	222.7	12 8	204	15.24	45.0	12 0
125	42.64	214.4	12 2	165	12.53	221.2	30 0	205	16.01	46.6	12 0
126	41.99	213.6	3	166	11.79	220.4	12 0	206	16.71	43.9	12 0
127	41.26	213.0	12 0	167	11.08	219.3	12 0	207	17.33	44.8	12 0
128	40.66	212.0	12 2	168	10.36	218.2	3	208	18.21	44.3	12 0
129	39.86	211.8	12 0	169	9.62	217.5	12 0	209	18.85	44.6	12 0
130	39.17	211.9	12 0	170	8.87	216.4	30 0	210	19.34	45.6	12 0
131	38.28	212.3	12 0	171	8.14	215.5	30 0	211	20.45	45.2	12 0
132	37.60	212.5	12 0	172	7.38	215.2	30 0	212	21.09	45.2	12 0
133	36.78	212.2	12 2	173	6.64	214.8	30 0	213	22.15	44.8	12 0
134	36.12	211.4	12 0	174	5.85	216.7	12 0	214	22.63	45.3	10
135	35.46	210.8	12 0	175	5.11	215.0	30 0	215	23.51	46.3	12 0
136	34.65	210.9	12 0	176	4.39	216.0	30 6	216	24.12	46.9	12 0
137	33.87	210.9	12 0	177	3.54	218.3	30 0	217	24.94	46.3	12 0
138	33.09	211.2	12 0	178	2.82	216.0	30 0	218	25.77	46.6	12 0
139	32.30	211.4	12 0	179	2.10	215.6	30 6	219	26.46	46.8	12 0
140	31.44	211.8	12 0	180	1.31	212.1	30 6	220	27.34	47.0	12 0

PACE 1987

Shot Number 10 Shot Point 25

Shot Time (Julian day, hr, min, sec): 152:09:30:00.005

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
101	74.18	220.9	12	0	141	45.31	215.7	12	0	181	15.40	222.9	30	0
102	73.52	220.8	12	0	142	44.54	215.8	12	0	182	14.87	223.4	30	0
103	72.77	220.9	12	0	143	43.77	216.1	12	0	183	14.63	223.5	30	0
104	71.98	220.8		1	144	42.99	216.3	12	2	184	13.92	224.3	30	0
105	71.23	220.8	12	0	145	42.11	217.1	12	0	185	13.16	223.6	30	0
106	70.50	220.6	12	0	146	41.20	218.5	30	0	186	12.40	223.3	12	0
107	69.74	220.7	12	0	147	40.44	218.9	12	0	187	11.65	222.9	30	0
108	68.96	221.0		5	148	39.60	219.3	12	0	188	10.87	222.2	12	0
109	68.20	220.8	12	0	149	38.83	219.8	12	0	189	10.09	221.4	12	0
110	67.40	220.9	12	0	150	38.07	220.2	12	0	190	9.36	221.5		1
111	66.69	220.8	12	0	151	37.26	221.0	12	0	191	8.67	221.7	30	0
112	65.95	220.8	12	0	152	36.62	220.9	30	0	192	7.87	222.5	30	0
113	65.26	220.9	12	0	153	35.72	220.5	12	0	193	7.15	220.9	30	0
114	64.42	220.9	12	0	154	34.98	221.0	12	0	194	6.42	219.7		1
115	63.75	220.6		1	155	34.24	221.3	12	0	195	5.69	219.8	30	0
116	63.20	220.2	12	0	156	33.94	221.1	12	0	196	4.93	221.5	30	6
117	62.73	219.8	12	0	157	33.46	221.7	12	0	197	4.14	222.4	30	6
118	62.19	219.6	12	0	158	32.65	223.3	12	0	198	3.36	226.4	30	6
119	61.51	219.4	12	0	159	32.05	223.3	12	0	199	2.65	217.5	30	6
120	60.72	219.3		1	160	31.32	223.5	12	0	200	1.92	214.3	30	6
121	60.06	218.9	12	0	161	30.53	223.8	12	0	201	1.16	223.4	88	0
122	59.39	218.5		1	162	29.68	223.7	12	0	202	0.40	192.1	88	0
123	58.59	218.1	12	0	163	29.03	223.4	12	0	203	0.04	168.7	88	6
124	58.02	217.3	12	0	164	28.22	223.2	30	0	204	0.54	90.6	88	0
125	57.37	216.8	12	0	165	27.39	222.5	12	0	205	1.42	81.4	30	6
126	56.69	216.2		3	166	26.65	222.2	12	0	206	1.85	47.5	30	6
127	55.94	215.8	12	0	167	25.93	221.8	12	0	207	2.49	52.6	88	0
128	55.31	215.2	12	2	168	25.20	221.4		3	208	3.35	47.8	30	6
129	54.50	215.0	12	0	169	24.45	221.2	12	0	209	4.00	48.7	68	0
130	53.81	215.1	12	0	170	23.70	220.9	12	0	210	4.52	52.6	30	0
131	52.94	215.5	12	0	171	22.95	220.7	12	0	211	5.61	49.6	48	0
132	52.27	215.7	12	0	172	22.19	220.8	12	0	212	6.25	49.2	30	0
133	51.43	215.5	12	2	173	21.45	220.9	12	0	213	7.29	47.4	30	0
134	50.75	215.0	12	0	174	20.68	221.6	30	0	214	7.79	48.9		10
135	50.07	214.6	12	0	175	19.93	221.4	12	0	215	8.69	51.2	30	0
136	49.26	214.7	12	0	176	19.22	221.8	30	0	216	9.33	52.5	30	0
137	48.48	214.8	12	0	177	18.39	222.5	30	0	217	10.12	50.5	30	0
138	47.72	215.1	12	0	178	17.67	222.3	12	0	218	10.96	50.8	30	0
139	46.93	215.2	12	0	179	16.95	222.6	30	0	219	11.65	51.0	30	0
140	46.09	215.6	12	0	180	16.15	222.6	30	0	220	12.54	51.3	12	0

PACE 1987

Shot Number 11 Shot Point 23

Shot Time (Julian day, hr, min, sec): 152:09:32:00.007

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	----	-----	---	----	---	----	-----	---	----	---	----	-----	---	----
101	40.27	220.5	12	2	141	11.99	200.0	12	0	181	18.53	39.6	12	0
102	39.61	220.4	12		142	11.23	199.4	12	0	182	19.07	39.2	12	0
103	38.86	220.6	12	2	143	10.43	199.2	12	0	183	19.30	39.2	12	0
104	38.07	220.4		1	144	9.64	199.0	12	2	184	20.03	38.8	12	0
105	37.32	220.3	12	0	145	8.62	200.9	30	0	185	20.77	39.4	12	0
106	36.59	219.9	12	0	146	7.49	206.4		4	186	21.53	39.7	12	0
107	35.83	220.1	12	0	147	6.68	207.6	30	0	187	22.27	40.1	12	0
108	35.05	220.8		5	148	5.81	208.3	30	0	188	23.05	40.5	12	0
109	34.29	220.4	12	0	149	5.00	210.4	30	0	189	23.82	40.9	12	0
110	33.49	220.5	12	0	150	4.20	212.8	30	0	190	24.55	40.9		1
111	32.78	220.3	12	0	151	3.35	219.2	30	0	191	25.24	40.8	12	0
112	32.04	220.2	12	0	152	2.71	217.2	30	0	192	26.04	40.6	12	2
113	31.35	220.6	12	0	153	1.85	209.2	30	0	193	26.76	41.1	12	0
114	30.51	220.5	12	0	154	1.07	218.0	30	0	194	27.50	41.3		10
115	29.84	219.8		1	155	0.35	238.0	88	0	195	28.22	41.3	12	2
116	29.30	218.9	12	0	156	0.03	209.9	88	0	196	28.98	40.9	12	0
117	28.84	218.1	12	2	157	0.55	5.7	12	6	197	29.77	40.8	12	0
118	28.30	217.6	12	0	158	1.77	357.4	30	0	198	30.57	40.4	12	2
119	27.63	217.1	12	0	159	2.25	7.6	30	0	199	31.27	41.3	12	2
120	26.84	216.9		1	160	2.92	14.8		4	200	32.01	41.4	12	0
121	26.21	215.9	12	0	161	3.69	18.5	30	0	201	32.75	40.9	12	0
122	25.56	214.8		1	162	4.47	23.4	30	0	202	33.56	41.3	12	2
123	24.79	213.9	12	0	163	5.04	27.8	30	0	203	33.89	41.1	12	0
124	24.29	211.7	12	0	164	5.80	30.9	12	2	204	34.27	41.7	12	0
125	23.69	210.5	12	0	165	6.56	35.3	12	0	205	35.00	42.5	12	0
126	23.09	208.9		3	166	7.29	37.1	12	0	206	35.75	41.3	12	0
127	22.39	207.7	12	0	167	7.99	38.9	12	0	207	36.36	41.8	12	0
128	21.87	205.8	12	2	168	8.71	40.3		3	208	37.24	41.6	12	0
129	21.09	205.1	12	0	169	9.46	40.9	12	0	209	37.88	41.8	68	0
130	20.40	204.9	12	0	170	10.22	41.5	12	0	210	38.35	42.3	12	2
131	19.48	205.4	12	0	171	10.96	41.8	12	0	211	39.46	42.2	12	2
132	18.79	205.6	12	0	172	11.72	41.6	12	0	212	40.10	42.3	12	2
133	18.00	204.7	12	2	173	12.46	41.4	12	0	213	41.17	42.1	12	2
134	17.42	202.9	12	0	174	13.23	40.2	12	2	214	41.64	42.4		1
135	16.82	201.3	30	0	175	13.98	40.7	12	2	215	42.50	43.1	12	0
136	16.02	201.0	12	0	176	14.69	40.1	12	0	216	43.10	43.4	12	2
137	15.24	200.5	12	0	177	15.54	39.3	12	0	217	43.93	43.1	12	2
138	14.45	200.6	12	0	178	16.25	39.7	12	0	218	44.75	43.4	12	2
139	13.65	200.3	12	0	179	16.98	39.6	12	0	219	45.44	43.5	12	2
140	12.77	200.5	12	0	180	17.77	39.6	12	0	220	46.31	43.7	12	2

PACE 1987

Shot Number 12 Shot Point 28

Shot Time (Julian day, hr, min, sec): 152:09:34:00.023

Loc	Dist (km)	Azim (deg)	Tape Db Grade	Loc	Dist (km)	Azim (deg)	Tape Db Grade	Loc	Dist (km)	Azim (deg)	Tape Db Grade
101	122.25	225.0	12 0	141	93.01	223.8	12 0	181	63.80	229.2	12 0
102	121.58	225.0	12 0	142	92.26	223.9	12 0	182	63.28	229.3	12 0
103	120.85	225.1	12 0	143	91.52	224.1	12 0	183	63.05	229.4	12 0
104	120.05	225.1	1	144	90.78	224.2	12 0	184	62.36	229.6	12 0
105	119.30	225.1	12 0	145	89.98	224.7	12 0	185	61.60	229.5	12 0
106	118.55	225.0	12 0	146	89.20	225.4	4	186	60.82	229.5	12 0
107	117.80	225.1	12 0	147	88.47	225.7	12 0	187	60.07	229.5	12 0
108	117.06	225.3	5	148	87.67	225.9	12 0	188	59.28	229.5	12 0
109	116.28	225.2	12 0	149	86.94	226.2	12 0	189	58.49	229.4	12 0
110	115.49	225.3	12 0	150	86.22	226.4	12 0	190	57.77	229.6	1
111	114.77	225.2	12 0	151	85.46	226.8	12 0	191	57.09	229.7	12 0
112	114.03	225.3	12 0	152	84.82	226.8	12 0	192	56.31	229.9	12 0
113	113.36	225.4	12 0	153	83.90	226.7	12 0	193	55.57	229.8	12 0
114	112.52	225.4	12 0	154	83.20	227.0	12 0	194	54.82	229.8	1
115	111.82	225.2	1	155	82.48	227.1	12 0	195	54.11	229.9	12 0
116	111.24	225.0	12 0	156	82.17	227.1	12 0	196	53.39	230.2	12 0
117	110.74	224.9	12 0	157	81.72	227.3	12 0	197	52.61	230.4	12 0
118	110.18	224.8	12 0	158	80.99	228.0	12 0	198	51.86	230.8	12 0
119	109.48	224.7	12 0	159	80.40	228.1	12 0	199	51.09	230.4	12 0
120	108.68	224.7	1	160	79.68	228.2	4	200	50.36	230.5	12 0
121	108.00	224.5	12 0	161	78.90	228.3	12 0	201	49.66	230.9	12 0
122	107.28	224.3	1	162	78.05	228.4	12 0	202	48.83	230.8	12 0
123	106.45	224.1	12 0	163	77.39	228.3	12 0	203	48.53	231.0	12 0
124	105.79	223.7	12 0	164	76.57	228.3	12 0	204	48.10	230.7	12 0
125	105.10	223.5	12 0	165	75.72	228.1	12 0	205	47.30	230.2	12 0
126	104.36	223.2	3	166	74.97	228.0	12 0	206	46.67	231.2	12 0
127	103.56	223.0	12 0	167	74.23	227.9	12 0	207	46.02	231.0	12 0
128	102.86	222.7	12 0	168	73.49	227.8	3	208	45.17	231.3	12 0
129	102.04	222.7	12 0	169	72.73	227.8	12 0	209	44.52	231.3	12 0
130	101.36	222.8	12 0	170	71.97	227.8	12 0	210	44.00	230.9	12 0
131	100.54	223.0	12 0	171	71.23	227.8	12 0	211	42.91	231.2	12 0
132	99.90	223.2	12 0	172	70.47	227.9	12 0	212	42.27	231.3	12 0
133	99.05	223.2	12 2	173	69.74	228.0	12 0	213	41.24	231.7	12 0
134	98.32	223.0	12 0	174	69.01	228.3	12 0	214	40.73	231.4	1
135	97.60	222.8	12 0	175	68.25	228.3	12 2	215	39.82	231.0	12 0
136	96.82	223.0	12 0	176	67.57	228.5	12 0	216	39.19	230.7	12 0
137	96.05	223.1	12 0	177	66.76	228.8	12 0	217	38.39	231.2	12 0
138	95.33	223.3	12 0	178	66.04	228.8	12 0	218	37.56	231.1	12 0
139	94.56	223.4	12 0	179	65.33	228.9	12 0	219	36.86	231.0	12 0
140	93.77	223.6	12 0	180	64.54	229.0	12 0	220	35.97	230.9	12 0

PACE 1987

Shot Number 13 Shot Point 35

Shot Time (Julian day, hr, min, sec): 152:09:36:00.010

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
101	11.03	224.5	12	0	141	18.35	51.1	12	0	181	47.80	39.1	12	2
102	10.37	224.1	12	0	142	19.07	50.3	12	0	182	48.34	39.0	12	2
103	9.63	225.5	12	0	143	19.77	49.1	12	0	183	48.57	39.0	12	2
104	8.84	224.9		1	144	20.49	48.1	12	0	184	49.30	38.8	12	2
105	8.09	225.1	30	0	145	21.24	46.1	12	0	185	50.04	39.1	12	2
106	7.34	223.5	30	0	146	22.02	43.1		4	186	50.80	39.2	12	2
107	6.59	224.8	30	0	147	22.76	42.2	12	0	187	51.54	39.3	12	2
108	5.86	229.7		5	148	23.58	41.5	12	0	188	52.31	39.5	12	2
109	5.08	228.4	48	0	149	24.34	40.6	12	0	189	53.08	39.7	12	2
110	4.30	230.9	30	6	150	25.10	39.9	12	0	190	53.82	39.7		1
111	3.58	231.0	30	6	151	25.92	38.8	12	0	191	54.50	39.7	12	2
112	2.85	232.9	30	6	152	26.56	39.1	12	0	192	55.31	39.6	12	0
113	2.25	242.2	30	6	153	27.45	39.5	12	0	193	56.02	39.9	12	0
114	1.47	252.3	30	6	154	28.20	38.9	12	0	194	56.76	40.0		1
115	0.70	254.9		1	155	28.94	38.6	12	0	195	57.48	40.0	12	2
116	0.03	178.9	88	6	156	29.24	38.9	12	0	196	58.24	39.8	12	2
117	0.61	83.0	30	6	157	29.73	38.3	12	0	197	59.04	39.8	12	2
118	1.19	73.5	30	6	158	30.62	36.7	12	0	198	59.83	39.6	12	2
119	1.89	67.7	30	6	159	31.22	36.7	12	0	199	60.53	40.1	12	2
120	2.64	60.9		1	160	31.95	36.7		4	200	61.27	40.1	12	2
121	3.40	63.2	68	0	161	32.75	36.6	12	0	201	62.02	39.9	12	2
122	4.22	65.3		1	162	33.60	36.8	12	0	202	62.82	40.1	12	2
123	5.08	64.7	48	0	163	34.23	37.2	12	0	203	63.15	40.0	12	2
124	6.02	69.6	48	0	164	35.02	37.5	12	2	204	63.52	40.3	12	2
125	6.80	69.7	30	0	165	35.82	38.2	12	0	205	64.24	40.8	12	2
126	7.70	70.7		3	166	36.55	38.5	12	0	206	65.01	40.2	12	0
127	8.53	69.8	30	0	167	37.26	38.9	12	2	207	65.61	40.4	12	0
128	9.42	71.0	12	2	168	37.98	39.2		3	208	66.49	40.3	12	2
129	10.15	68.8	30	0	169	38.73	39.3	12	3	209	67.13	40.5	68	2
130	10.70	66.4	30	0	170	39.48	39.5	12	2	210	67.59	40.8	12	2
131	11.30	62.7	12	0	171	40.22	39.6	12	2	211	68.71	40.7	12	2
132	11.81	60.4	12	0	172	40.99	39.6	12	0	212	69.35	40.8	12	2
133	12.63	59.4	12	2	173	41.72	39.6	12	0	213	70.41	40.7	12	2
134	13.44	60.0	12	0	174	42.50	39.2	12	2	214	70.88	40.9		1
135	14.20	60.0	30	0	175	43.25	39.4	12	2	215	71.73	41.3	12	0
136	14.89	58.3	12	0	176	43.96	39.2	12	0	216	72.31	41.5	12	2
137	15.59	57.0	12	0	177	44.81	39.0	12	0	217	73.15	41.4	12	2
138	16.21	55.2	12	0	178	45.52	39.1	12	2	218	73.97	41.5	12	2
139	16.91	53.8	12	0	179	46.25	39.1	12	0	219	74.65	41.6	12	2
140	17.63	52.1	12	0	180	47.04	39.1	12	2	220	75.52	41.8	12	2

PACE 1987

Shot Number 14 Shot Point 27

Shot Time (Julian day, hr, min, sec): 155:05:00:00.010

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
223	7.12	232.0	30	0	263	21.68	50.1	12	0	306	51.10	50.2	12	0
224	6.49	229.6	30	6	264	22.50	50.6	12	0	308	52.59	49.7	12	0
225	5.84	231.9	30	6	265	23.23	50.7	30	0	309	53.35	49.7	12	0
226	5.11	237.0	30	6	266	24.02	50.3	12	0	310	54.06	49.8	12	0
227	4.67	231.8		1	267	24.75	50.1	12	0	311	54.82	49.7	12	0
228	3.89	221.1	68	0	268	25.55	51.4	12	0	313	56.32	49.7	12	0
229	3.20	212.9	68	0	269	26.30	51.2	12	0	314	57.06	49.5	12	0
230	2.58	200.1	30	6	270	26.83	50.5	12	0	315	57.76	49.1	12	0
231	2.10	185.6		1	271	27.14	50.5	12	0	316	58.43	48.2	12	0
232	0.97	199.1	30	6	273	27.59	49.6	12	0	317	59.14	47.6		1
233	0.49	199.4		1	274	28.70	49.4	12	0	318	59.62	47.5	12	0
234	0.02	67.4	88	0	275	29.24	49.6	12	0	319	60.14	47.1	12	0
235	0.58	59.0	88	0	276	30.03	50.4	12	0	320	60.66	47.3	12	0
236	1.35	35.9	30	6	277	30.81	50.8	12	0	321	61.36	46.9	12	0
237	2.20	61.0	30	6	279	32.54	53.7	12	0	322	62.13	46.8	12	0
238	2.97	59.3		3	280	33.25	53.2	12	0	323	62.79	46.6	12	0
239	3.41	51.3	30	2	281	34.07	52.6	12	0	324	63.60	46.5	12	0
240	4.30	45.9	30	6	282	34.75	52.6	12	0	325	64.33	46.1	12	0
241	5.10	48.4	68	0	283	35.66	52.2	12	0	326	65.09	46.2	12	0
242	6.04	43.5	30	0	284	36.28	52.1	12	0	328	66.59	46.4		1
243	6.67	50.0	12	0	285	36.57	52.1	21	0	329	67.33	46.3		1
244	7.47	51.5		3	286	36.96	52.0	21	0	330	68.07	46.1	12	0
245	8.13	50.3	48	0	287	37.72	52.1	21	0	331	68.84	45.7	48	0
246	8.99	53.2	30	0	288	38.51	52.3	21	0	332	69.56	45.4	12	0
247	9.79	51.1	30	0	289	39.21	52.2	21	0	333	70.28	45.4	12	0
248	10.55	51.8	30	0	290	39.92	51.5	21	0	335	71.81	46.4	12	0
249	11.15	50.2	30	0	291	40.63	51.3	21	0	336	72.62	46.8	12	0
250	11.83	52.0	30	0	292	41.15	50.9		3	337	73.39	47.0	12	0
251	12.75	51.3	30	0	293	41.71	51.4	21	0	338	74.16	47.2	12	0
252	13.53	50.5		1	294	42.24	51.8	21	0	339	74.90	47.1	12	0
253	14.25	50.3	30	0	295	42.99	51.8	21	0	340	75.65	47.1	12	0
254	15.04	50.0	30	0	296	43.73	51.8	12	0	341	76.41	47.0	12	0
255	15.78	51.5	30	0	297	44.44	51.4	12	0	342	77.25	47.4	12	0
256	16.58	51.8	12	0	298	45.20	51.5	12	0	343	77.95	47.6	12	2
257	17.26	51.4	12	0	299	45.93	51.4		1	345	79.46	47.7	12	0
258	18.09	51.7	12	0	300	46.72	51.5	12	0	346	80.24	47.9	12	0
259	18.75	51.0	12	0	302	48.15	51.2	12	0	347	80.97	48.1	12	0
260	19.24	50.4	12	0	303	48.88	50.5	12	0	348	81.76	48.2	12	0
261	19.93	50.2	12	0	304	49.61	50.3	12	0	349	82.54	48.2	12	0
262	21.05	50.3	12	0	305	50.30	50.4	12	0	350	82.93	48.2	12	0

PACE 1987

Shot Number 15 Shot Point 20

Shot Time (Julian day, hr, min, sec): 155:05:02:00.005

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
223	124.71	45.4	30	0	263	153.43	46.3	12	0	306	182.81	46.8	12	0
224	125.31	45.5	30	0	264	154.24	46.3	12	0	308	184.31	46.7	12	0
225	125.98	45.5	30	0	265	154.96	46.4	30	0	309	185.07	46.7	12	0
226	126.77	45.3	30	0	266	155.76	46.3	12	0	310	185.79	46.7	30	0
227	127.14	45.5		1	267	156.49	46.3	12	0	311	186.54	46.7	12	0
228	127.92	45.9	12	6	268	157.26	46.6	12	0	313	188.04	46.7	12	0
229	128.69	46.0	30	0	269	158.01	46.5	12	0	314	188.79	46.7	12	0
230	129.48	46.2	30	0	270	158.56	46.4	12	0	315	189.50	46.6	12	0
231	130.21	46.3		1	271	158.87	46.4	12	0	316	190.20	46.3	30	0
232	130.93	45.9	30	0	273	159.34	46.3	12	0	317	190.93	46.1		1
233	131.36	45.8		1	274	160.46	46.3	12	0	318	191.40	46.1	12	0
234	131.81	45.7	30	0	275	160.99	46.3	12	0	319	191.93	46.0	12	0
235	132.36	45.8	30	0	276	161.76	46.5	12	0	320	192.45	46.0	12	0
236	133.12	45.6	30	0	277	162.53	46.6	12	0	321	193.15	45.9	12	0
237	133.92	46.0	30	0	279	164.12	47.2	12	0	322	193.92	45.9	12	0
238	134.69	46.0		3	280	164.84	47.1	12	0	323	194.58	45.8	12	0
239	135.19	45.8	30	2	281	165.69	47.0	12	0	324	195.39	45.8	12	0
240	136.10	45.7	30	0	282	166.38	47.0	12	0	325	196.12	45.6	12	0
241	136.88	45.8	30	0	283	167.30	47.0	12	0	326	196.89	45.7	12	0
242	137.82	45.6	12	0	284	167.92	47.0		4	328	198.38	45.8		1
243	138.45	45.9	12	2	285	168.22	47.0	21	0	329	199.12	45.7		1
244	139.24	46.0		3	286	168.61	47.0	21	0	330	199.86	45.6	12	0
245	139.90	46.0	30	0	287	169.37	47.0	21	0	331	200.63	45.5	12	0
246	140.72	46.2	30	0	288	170.14	47.1	21	0	332	201.35	45.4	12	0
247	141.55	46.1	30	0	289	170.85	47.1	21	0	333	202.06	45.4	12	0
248	142.30	46.1	12	0	290	171.59	46.9		4	335	203.61	45.7	12	0
249	142.92	46.0	30	0	291	172.30	46.9	21	0	336	204.41	45.9	12	0
250	143.57	46.2	30	0	292	172.83	46.8		3	337	205.18	46.0	12	0
251	144.50	46.2	30	0	293	173.38	46.9	21	0	338	205.95	46.0	12	0
252	145.29	46.1		1	294	173.89	47.1	21	0	339	206.69	46.0		3
253	146.01	46.1	30	0	295	174.63	47.1	21	0	340	207.44	46.0	12	0
254	146.81	46.1	30	0	296	175.37	47.1	12	0	341	208.20	46.0	12	0
255	147.52	46.3	30	0	297	176.10	47.0	12	0	342	209.04	46.1	12	0
256	148.31	46.3	30	0	298	176.85	47.0	12	0	343	209.73	46.2	12	0
257	148.99	46.3	30	0	299	177.59	47.0		1	345	211.24	46.2	12	0
258	149.81	46.4	30	0	300	178.37	47.1	12	0	346	212.02	46.3	12	0
259	150.48	46.3	30	0	302	179.81	47.0	12	0	347	212.74	46.4	12	0
260	150.99	46.2	12	0	303	180.58	46.9	12	0	348	213.53	46.5	12	0
261	151.69	46.2	12	2	304	181.31	46.8	12	0	349	214.31	46.5	12	0
262	152.80	46.3	12	0	305	182.00	46.8	12	0	350	214.69	46.5	12	0

PACE 1987

Shot Number 16 Shot Point 31

Shot Time (Julian day, hr, min, sec): 155:05:04:00.010

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
223	90.06	228.9	12	0	263	61.30	228.0	12	0	306	31.93	225.6	12	0
224	89.45	228.7	12	0	264	60.49	227.8	12	0	308	30.42	226.1	12	0
225	88.79	228.9	12	0	265	59.76	227.7	12	0	309	29.66	226.0	12	0
226	88.01	229.1	12	0	266	58.96	227.8	12	0	310	28.95	225.8	30	0
227	87.62	228.8		1	267	58.23	227.8	12	0	311	28.19	225.8	12	0
228	86.82	228.3	12	0	268	57.47	227.2	12	0	313	26.70	225.5	30	0
229	86.05	228.1	12	0	269	56.71	227.3	12	0	314	25.94	225.9	12	0
230	85.24	227.8	12	0	270	56.17	227.5	12	0	315	25.22	226.7	12	0
231	84.51	227.7		1	271	55.85	227.6	12	0	316	24.53	228.8	30	0
232	83.81	228.3	12	0	273	55.38	228.0	12	0	317	23.83	230.2		1
233	83.39	228.5		1	274	54.27	228.0	12	0	318	23.36	230.5	12	0
234	82.94	228.6	12	0	275	53.73	227.9	12	0	319	22.86	231.6	30	0
235	82.39	228.6	12	0	276	52.96	227.4	12	0	320	22.33	231.1	30	0
236	81.64	228.8	12	0	277	52.20	227.1	12	0	321	21.66	232.3	30	0
237	80.82	228.3	12	0	279	50.66	225.2	12	0	322	20.91	233.0	30	0
238	80.04	228.2		3	280	49.92	225.3	12	0	323	20.27	233.7	30	0
239	79.55	228.5	30	2	281	49.06	225.6	12	0	324	19.50	234.5	30	0
240	78.66	228.8	12	0	282	48.37	225.5	12	0	325	18.83	236.1	30	0
241	77.86	228.6	12	0	283	47.45	225.6	12	0	326	18.06	236.0	12	0
242	76.95	229.0	12	0	284	46.83	225.7		4	328	16.54	235.9		1
243	76.29	228.5		4	285	46.53	225.6	21	0	329	15.83	236.9		1
244	75.50	228.3		3	286	46.15	225.6	21	0	330	15.16	238.4	12	0
245	74.84	228.4	12	0	287	45.39	225.5	21	0	331	14.51	240.8	30	0
246	74.01	228.0	12	0	288	44.63	225.1	21	0	332	13.90	242.8	30	0
247	73.18	228.2	12	0	289	43.92	225.1	21	0	333	13.23	243.8	30	0
248	72.43	228.1	12	0	290	43.16	225.7		4	335	11.43	240.5	30	0
249	71.81	228.3	12	0	291	42.44	225.7	21	0	336	10.53	238.8	30	0
250	71.16	228.0	12	0	292	41.90	226.0		3	337	9.71	238.0	30	0
251	70.23	228.1	12	0	293	41.37	225.5	21	0	338	8.92	237.5	30	0
252	69.44	228.2		1	294	40.88	224.9	21	0	339	8.20	238.7	48	0
253	68.72	228.2	12	0	295	40.14	224.8	21	0	340	7.47	240.2	30	0
254	67.93	228.2	12	0	296	39.41	224.7	12	0	341	6.77	242.9	30	0
255	67.21	227.9	12	0	297	38.66	225.0	12	0	342	5.84	240.5	30	0
256	66.41	227.7	12	0	298	37.92	224.8	12	0	343	5.09	238.8	30	6
257	65.73	227.8	12	0	299	37.18	224.7		1	345	3.59	241.6	30	6
258	64.91	227.7	12	0	300	36.42	224.4	12	0	346	2.76	238.8	30	6
259	64.24	227.8	12	0	302	34.96	224.6	12	0	347	2.00	234.3	12	6
260	63.73	228.0	12	0	303	34.17	225.4	12	0	348	1.20	230.3	88	0
261	63.04	228.0	12	2	304	33.43	225.6	12	0	349	0.42	232.3	88	0
262	61.92	227.9	12	0	305	32.75	225.3	12	0	350	0.04	266.4	88	6

PACE 1987

Shot Number 17 Shot Point 34

Shot Time (Julian day, hr, min, sec): 155:05:06:00.012

Loc	Dist (km)	Azim (deg)	Tape Db	Grade	Loc	Dist (km)	Azim (deg)	Tape Db	Grade	Loc	Dist (km)	Azim (deg)	Tape Db	Grade
223	222.98	227.1	12	2	263	194.28	226.4	12	2	306	164.98	225.6	12	0
224	222.38	227.0	12	2	264	193.48	226.3	12	2	308	163.46	225.7	12	0
225	221.70	227.0	12	2	265	192.76	226.3	12	0	309	162.70	225.6	12	0
226	220.91	227.1	12	2	266	191.96	226.3	12	2	310	162.00	225.6	12	0
227	220.54	227.0		1	267	191.22	226.3	12	0	311	161.24	225.6	12	2
228	219.77	226.8	68	0	268	190.48	226.1	12	2	313	159.75	225.5	12	0
229	219.01	226.7	12	2	269	189.72	226.2	12	2	314	158.99	225.6	12	0
230	218.22	226.6	12	0	270	189.17	226.2	12	2	315	158.26	225.7	12	
231	217.50	226.5		1	271	188.85	226.2	12	2	316	157.53	226.0	12	0
232	216.76	226.8	12	0	273	188.37	226.3	12	2	317	156.79	226.2		10
233	216.33	226.8		1	274	187.26	226.3	12	0	318	156.31	226.3	12	0
234	215.88	226.9	12	0	275	186.73	226.3	12	2	319	155.77	226.4	12	0
235	215.33	226.9	12	0	276	185.97	226.2	12	2	320	155.26	226.3	12	0
236	214.57	226.9	12	0	277	185.22	226.1	12	2	321	154.55	226.5	12	0
237	213.78	226.7	12	0	279	183.71	225.5	12	0	322	153.78	226.5	12	0
238	213.00	226.7		3	280	182.97	225.6	12	2	323	153.11	226.6	12	0
239	212.50	226.8		2	281	182.11	225.6	12	2	324	152.30	226.7	12	0
240	211.59	226.9	12	2	282	181.42	225.6	12	2	325	151.57	226.8	12	0
241	210.81	226.8	12	0	283	180.50	225.6	12	2	326	150.80	226.8	12	0
242	209.87	227.0	12	0	284	179.87	225.6		4	328	149.31	226.6		10
243	209.24	226.8	48	2	285	179.58	225.6	21	0	329	148.57	226.7		1
244	208.46	226.7		3	286	179.19	225.6	21	2	330	147.83	226.8	12	0
245	207.80	226.7	12	0	287	178.44	225.6	21	0	331	147.06	227.0	12	0
246	206.98	226.6	12	0	288	177.68	225.5	21	0	332	146.34	227.1	12	0
247	206.14	226.6	12	0	289	176.97	225.5	21	2	333	145.62	227.1	12	0
248	205.41	226.6	12	2	290	176.20	225.6		4	335	144.09	226.7	12	0
249	204.78	226.7	12	0	291	175.49	225.6	21	2	336	143.29	226.4	12	0
250	204.14	226.5	12	0	292	174.95	225.7		3	337	142.53	226.3	12	0
251	203.20	226.5	48	0	293	174.42	225.6	21	0	338	141.76	226.2	12	0
252	202.41	226.6		1	294	173.93	225.5	21	0	339	141.02	226.2	12	0
253	201.69	226.6	12	2	295	173.19	225.4	21	2	340	140.27	226.2	12	0
254	200.90	226.6	12	2	296	172.46	225.4	12	0	341	139.50	226.3	12	0
255	200.20	226.4	12	0	297	171.71	225.5	12	2	342	138.68	226.1	12	0
256	199.41	226.4	12	2	298	170.97	225.4	12	0	343	138.00	225.9	12	0
257	198.72	226.4	12	2	299	170.23	225.4		1	345	136.49	225.9	12	0
258	197.91	226.4	12	2	300	169.47	225.3	12	0	346	135.73	225.7	12	0
259	197.23	226.4	48	0	302	168.01	225.4	12	0	347	135.02	225.6	12	0
260	196.72	226.4	12	2	303	167.22	225.6	12	0	348	134.24	225.5	12	0
261	196.02	226.4	12	2	304	166.47	225.6	12	0	349	133.46	225.5	12	0
262	194.91	226.4	12	2	305	165.80	225.5	12	0	350	133.08	225.4	12	0

PACE 1987

Shot Number 18 Shot Point 29

Shot Time (Julian day, hr, min, sec): 155:05:08:00.008

Loc	Dist (km)	Azim (deg)	Tape Db	Grade	Loc	Dist (km)	Azim (deg)	Tape Db	Grade	Loc	Dist (km)	Azim (deg)	Tape Db	Grade
223	47.74	231.6	12	0	263	18.96	233.0	30	0	306	10.52	45.7	48	0
224	47.12	231.3	30	0	264	18.13	232.6	30	0	308	12.04	44.2	48	0
225	46.46	231.6	12	0	265	17.40	232.4	30	6	309	12.79	44.6	48	0
226	45.71	232.2	12	0	266	16.62	233.1	30	0	310	13.50	45.1	48	0
227	45.30	231.6		1	267	15.89	233.4	30	0	311	14.26	45.2	30	0
228	44.45	230.7	12	0	268	15.07	231.5	30	0	313	15.75	45.6	30	0
229	43.67	230.2	30	0	269	14.33	231.9	30	0	314	16.51	45.1	30	6
230	42.85	229.8	30	0	270	13.81	233.1	30	0	315	17.24	43.9	30	0
231	42.11	229.5		1	271	13.49	233.4	30	0	316	18.01	41.2	30	0
232	41.45	230.8	30	0	273	13.08	235.3	30	6	317	18.80	39.7		10
233	41.04	231.2		1	274	11.98	236.2	30	6	318	19.28	39.6	30	0
234	40.60	231.5	30	0	275	11.43	235.9	30	0	319	19.86	38.6	30	0
235	40.05	231.4	30	0	276	10.61	234.3	30	6	320	20.34	39.4	30	0
236	39.33	232.1	30	0	277	9.82	233.3	30	6	321	21.09	38.6	30	0
237	38.46	231.0	30	0	279	8.22	222.4	30	6	322	21.87	38.5	30	0
238	37.68	230.9		3	280	7.47	223.3	30	0	323	22.56	38.2	30	0
239	37.21	231.6		2	281	6.61	225.1	30	6	324	23.38	38.1	30	0
240	36.34	232.2	30	0	282	5.92	224.5	30	6	325	24.17	37.4	30	0
241	35.54	232.0	30	0	283	5.00	225.2	30	6	326	24.90	37.9	30	0
242	34.65	232.9	12	0	284	4.37	225.6		4	328	26.35	39.0		10
243	33.95	231.8	12	2	285	4.08	224.8	30	6	329	27.10	38.9		1
244	33.15	231.5		3	286	3.69	224.8	30	6	330	27.87	38.6	12	0
245	32.50	231.8	30	0	287	2.94	222.6	30	6	331	28.69	37.9	30	0
246	31.64	231.0	30	0	288	2.22	214.6	30	6	332	29.45	37.4	30	0
247	30.83	231.6	30	0	289	1.52	210.2	30	6	333	30.16	37.6	30	0
248	30.08	231.4	12	0	290	0.70	225.5		4	335	31.54	40.1	30	0
249	29.47	232.0	30	0	291	0.03	334.9	88	6	336	32.29	41.2	30	0
250	28.79	231.3	30	0	292	0.60	21.6		3	337	33.03	41.9	12	0
251	27.87	231.6	30	0	293	1.09	51.4	88	0	338	33.78	42.3	30	0
252	27.09	232.0		1	294	1.65	63.1	30	6	339	34.52	42.4	30	0
253	26.38	232.1	30	0	295	2.38	59.2	30	6	340	35.27	42.4	30	0
254	25.59	232.3	30	0	296	3.12	57.6	68	0	341	36.04	42.3	30	0
255	24.84	231.5	30	0	297	3.82	51.6	68	0	342	36.84	43.1	30	0
256	24.04	231.3	12	0	298	4.57	52.7	30	6	343	37.51	43.7	30	0
257	23.36	231.5	30	0	299	5.31	51.9		1	345	39.01	44.0	30	0
258	22.53	231.3	30	0	300	6.10	52.9	48	0	346	39.77	44.6	12	0
259	21.88	231.9	30	0	302	7.53	50.5	48	0	347	40.48	45.0	12	0
260	21.39	232.4	30	0	303	8.28	46.4	30	0	348	41.26	45.3	30	0
261	20.70	232.6	12	2	304	9.02	45.6	48	0	349	42.04	45.4	12	0
262	19.58	232.7	30	0	305	9.70	46.5	48	0	350	42.42	45.4	12	0

PACE 1987

Shot Number 19 Shot Point 26

Shot Time (Julian day, hr, min, sec): 155:07:30:00.010

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
			Db	Grade				Db	Grade				Db	Grade
223	0.03	30.7	88	6	263	28.82	50.5	12	0	306	58.25	50.3	12	0
224	0.71	73.3	88	0	264	29.65	50.8	12	0	308	59.73	49.9	12	0
225	1.31	52.0	88	0	265	30.38	51.0	30	0	309	60.49	49.9	12	0
226	2.11	39.4	88	0	266	31.16	50.6	12	0	310	61.21	50.0	12	0
227	2.48	52.1		1	267	31.90	50.5	12	0	311	61.96	49.9	12	0
228	3.41	64.1	68	0	268	32.70	51.5	12	0	313	63.46	49.9	30	0
229	4.26	66.0	68	0	269	33.45	51.3	12	0	314	64.20	49.7	12	0
230	5.14	67.2	30	6	270	33.97	50.8	12	0	315	64.90	49.3	12	0
231	5.90	66.8		1	271	34.29	50.7	12	0	316	65.57	48.6	12	0
232	6.36	56.6	30	6	273	34.73	50.0	12	0	317	66.28	48.0		10
233	6.74	54.1		1	274	35.84	49.9	12	0	318	66.75	48.0	12	0
234	7.17	51.9	30	6	275	36.38	50.0	12	0	319	67.27	47.6	12	0
235	7.73	52.4	30	6	276	37.18	50.6	12	0	320	67.79	47.8	12	0
236	8.45	49.3	30	6	277	37.96	51.0	12	0	321	68.49	47.4	12	0
237	9.32	54.0	30	6	279	39.69	53.3	12	0	322	69.25	47.3	12	0
238	10.11	54.0		3	280	40.39	52.9	12	0	323	69.91	47.1	12	0
239	10.56	51.7		2	281	41.21	52.4	12	0	324	70.72	47.0	12	0
240	11.44	49.6	30	0	282	41.90	52.4	12	0	325	71.45	46.6	12	0
241	12.24	50.4	30	0	283	42.81	52.2	12	0	326	72.21	46.7	12	0
242	13.15	48.0	30	0	284	43.43	52.0	12	0	328	73.71	46.9		10
243	13.82	51.0	30	0	285	43.72	52.0	21	0	329	74.45	46.8		1
244	14.62	51.7		3	286	44.11	52.0	21	0	330	75.18	46.6	12	0
245	15.27	51.0	30	0	287	44.87	52.0	21	0	331	75.95	46.3	12	0
246	16.14	52.6	30	0	288	45.66	52.2	21	0	332	76.67	46.0	12	0
247	16.94	51.4	30	0	289	46.36	52.1	21	0	333	77.38	46.0	12	0
248	17.70	51.8	12	0	290	47.07	51.5	21	0	335	78.93	46.8	30	0
249	18.30	50.8	30	0	291	47.78	51.4	21	0	336	79.74	47.2	30	0
250	18.98	51.9	30	0	292	48.29	51.0		3	337	80.52	47.4	12	0
251	19.90	51.5	30	0	293	48.86	51.4	21	0	338	81.29	47.6	30	0
252	20.68	50.9		1	294	49.39	51.8	21	0	339	82.03	47.5	30	0
253	21.40	50.8	12	0	295	50.14	51.8	21	0	340	82.78	47.5	12	0
254	22.19	50.6		4	296	50.87	51.8	12	0	341	83.54	47.4	12	0
255	22.93	51.6	30	0	297	51.59	51.4	12	0	342	84.38	47.7	12	0
256	23.73	51.8	12	0	298	52.35	51.5	12	0	343	85.08	47.9	12	0
257	24.41	51.5	12	0	299	53.08	51.4		1	345	86.60	48.0	12	0
258	25.24	51.7	12	0	300	53.87	51.6	12	0	346	87.38	48.2	12	0
259	25.90	51.2	30	0	302	55.30	51.2	12	0	347	88.11	48.4	12	0
260	26.39	50.8	12	0	303	56.03	50.6	12	0	348	88.90	48.5	12	0
261	27.08	50.6	12	0	304	56.76	50.5	12	0	349	89.68	48.5	12	0
262	28.20	50.7	12	0	305	57.44	50.5	12	0	350	90.06	48.5	12	0

PACE 1987

Shot Number 20 Shot Point 21

Shot Time (Julian day, hr, min, sec): 155:07:31:59.871

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
			Db	Grade				Db	Grade				Db	Grade
223	88.49	42.2	30	0	263	117.07	44.2	12	0	306	146.38	45.3	30	0
224	89.06	42.5	30	0	264	117.87	44.3	12	0	308	147.89	45.2	12	0
225	89.75	42.4	12	0	265	118.59	44.4	30	0	309	148.65	45.2	12	0
226	90.56	42.2	30	0	266	119.39	44.3	12	0	310	149.36	45.3	12	0
227	90.90	42.5		1	267	120.13	44.3	12	0	311	150.12	45.3	12	0
228	91.63	43.0	30	0	268	120.87	44.6	12	0	313	151.61	45.3	12	0
229	92.38	43.3	30	0	269	121.62	44.6	12	0	314	152.37	45.2	12	0
230	93.15	43.6	30	0	270	122.18	44.5	12	0	315	153.10	45.1	12	0
231	93.87	43.7		1	271	122.49	44.5	12	0	316	153.82	44.8	12	0
232	94.64	43.2	30	0	273	122.98	44.3	12	0	317	154.56	44.6		10
233	95.07	43.1		1	274	124.09	44.3	12	0	318	155.04	44.5	12	0
234	95.54	42.9	12	0	275	124.62	44.4	12	0	319	155.58	44.4	12	0
235	96.08	43.0	12	0	276	125.38	44.6	12	0	320	156.09	44.5	12	0
236	96.85	42.8	12	0	277	126.13	44.8	12	0	321	156.81	44.3	12	0
237	97.61	43.3	12	0	279	127.66	45.6	12	0	322	157.57	44.3	12	0
238	98.38	43.4		3	280	128.40	45.5	12	0	323	158.24	44.2	12	0
239	98.89	43.2		2	281	129.25	45.4	12	0	324	159.06	44.2	12	0
240	99.82	43.0	30	0	282	129.94	45.4	12	0	325	159.80	44.0	12	0
241	100.59	43.2	12	0	283	130.86	45.4	12	0	326	160.56	44.1	12	0
242	101.55	42.9	12	0	284	131.49	45.3		4	328	162.05	44.2		10
243	102.15	43.4	30	0	285	131.78	45.4	21	0	329	162.79	44.2		1
244	102.92	43.5		3	286	132.17	45.4	21	0	330	163.54	44.1	12	0
245	103.59	43.5	30	0	287	132.93	45.4	21	0	331	164.32	43.9	12	0
246	104.39	43.8	30	0	288	133.69	45.5	21	0	332	165.05	43.8	12	0
247	105.23	43.7	30	0	289	134.40	45.5	21	0	333	165.77	43.8	12	0
248	105.96	43.8	30	0	290	135.16	45.3	21	0	335	167.27	44.2	12	0
249	106.60	43.7	30	0	291	135.87	45.3	21	0	336	168.06	44.4	12	0
250	107.23	43.9	30	0	292	136.41	45.2		3	337	168.82	44.5	12	0
251	108.16	43.9	30	0	293	136.94	45.4	21	0	338	169.58	44.6	12	0
252	108.96	43.8		1	294	137.44	45.5	21	0	339	170.33	44.6	12	0
253	109.68	43.8	12	0	295	138.18	45.6	21	0	340	171.08	44.6	12	0
254	110.47	43.8		4	296	138.92	45.6	12	0	341	171.84	44.6	12	0
255	111.16	44.1	12	0	297	139.66	45.5	12	0	342	172.66	44.7	12	0
256	111.95	44.2	12	0	298	140.40	45.6	12	0	343	173.35	44.8	12	0
257	112.63	44.2	12	0	299	141.14	45.6		1	345	174.86	44.9	12	0
258	113.45	44.3	12	0	300	141.91	45.6	30	0	346	175.62	45.0	12	0
259	114.12	44.2	12	0	302	143.36	45.6	12	0	347	176.34	45.1	12	0
260	114.64	44.1	12	0	303	144.15	45.4	12	0	348	177.12	45.2	12	0
261	115.33	44.1	12	2	304	144.89	45.3	12	0	349	177.90	45.2	12	0
262	116.44	44.2	12	0	305	145.56	45.4	12	0	350	178.28	45.2	12	0

PACE 1987

Shot Number 21 Shot Point 30

Shot Time (Julian day, hr, min, sec): 155:07:34:00.010

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
223	66.75	228.3	12	0	263	38.01	226.3	12	0	306	8.92	212.5	30	0
224	66.15	228.0	12	0	264	37.21	225.9	12	0	308	7.38	212.1	30	0
225	65.48	228.2	12	0	265	36.49	225.7	12	0	309	6.67	210.0	30	0
226	64.70	228.5	12	0	266	35.69	225.9	12	0	310	6.02	207.2	48	0
227	64.32	228.1		1	267	34.95	225.9	12	0	311	5.31	204.6	30	0
228	63.52	227.4	12	0	268	34.21	224.9	12	0	313	4.01	195.2	30	6
229	62.75	227.0	12	0	269	33.45	224.9	12	0	314	3.29	190.8	30	6
230	61.96	226.7	12	0	270	32.90	225.3	12	0	315	2.48	188.5	30	6
231	61.23	226.5		1	271	32.58	225.3	12	0	316	1.41	198.3	30	6
232	60.51	227.3	12	0	273	32.10	226.0	12	0	317	0.52	216.3		10
233	60.09	227.6		1	274	30.99	226.0	12	0	318	0.04	215.7	88	6
234	59.63	227.8	12	0	275	30.46	225.7	12	0	319	0.64	7.2	88	0
235	59.09	227.7	12	0	276	29.70	224.9	12	0	320	1.03	36.8	30	6
236	58.33	228.0	12	0	277	28.95	224.3	12	0	321	1.81	28.3	30	6
237	57.52	227.3	12	0	279	27.53	220.5	12	0	322	2.59	30.3	30	6
238	56.75	227.2		3	280	26.78	220.7	12	0	323	3.28	30.3	30	6
239	56.25	227.5		2	281	25.90	221.1	12	0	324	4.10	31.2	30	0
240	55.35	227.9	12	0	282	25.22	220.8	12	0	325	4.92	28.7	30	0
241	54.56	227.7	12	0	283	24.29	220.8	12	0	326	5.62	32.4	30	0
242	53.64	228.2	12	0	284	23.67	220.8		4	328	7.03	37.6		10
243	52.99	227.5	12	0	285	23.38	220.6	21	0	329	7.79	37.4		1
244	52.20	227.2		3	286	23.00	220.5	21	0	330	8.56	36.3	30	0
245	51.54	227.3	12	0	287	22.25	220.1	21	0	331	9.40	34.5	30	0
246	50.72	226.8	12	0	288	21.53	219.1	21	0	332	10.18	33.5	30	0
247	49.88	227.1	12	0	289	20.82	219.0	21	0	333	10.88	34.2	30	0
248	49.14	226.9	12	0	290	20.02	219.9	21	0	335	12.23	41.1	30	0
249	48.52	227.2	12	0	291	19.30	219.7	30	0	336	12.99	43.7	30	0
250	47.87	226.7	12	0	292	18.75	220.2		3	337	13.75	45.1	30	0
251	46.94	226.8	12	0	293	18.25	219.0	30	0	338	14.51	46.1	30	0
252	46.15	226.9		1	294	17.82	217.5	30	0	339	15.25	46.0	30	0
253	45.43	226.9	12	0	295	17.09	217.0	30	0	340	16.00	45.9	30	0
254	44.63	226.9		4	296	16.38	216.3	30	0	341	16.77	45.4	30	0
255	43.93	226.3	12	0	297	15.61	216.7	30	0	342	17.60	47.1	30	0
256	43.13	226.1	12	0	298	14.90	215.7	30	0	343	18.30	48.1	30	0
257	42.45	226.2	12	0	299	14.18	215.1		1	345	19.81	48.4	30	0
258	41.63	226.0	12	0	300	13.46	213.7	30	0	346	20.59	49.3	12	0
259	40.96	226.2	12	0	302	12.01	212.9	30	0	347	21.33	50.0	12	0
260	40.45	226.4	12	0	303	11.13	214.6	30	0	348	22.12	50.4	30	0
261	39.76	226.4	12	2	304	10.39	214.4	30	0	349	22.90	50.4	12	0
262	38.64	226.2	12	0	305	9.75	212.8	30	0	350	23.29	50.3	12	0

PACE 1987

Shot Number 22 Shot Point 33

Shot Time (Julian day, hr, min, sec): 155:07:36:00.012

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
223	178.26	226.2	12	2	263	149.61	225.2	12	2	306	120.36	223.8	12	0
224	177.66	226.1	12	2	264	148.81	225.1	12	3	308	118.84	223.9	12	2
225	176.99	226.1	12	2	265	148.09	225.0	12	0	309	118.09	223.8	12	0
226	176.19	226.2	12	2	266	147.28	225.1	12	2	310	117.38	223.8	12	0
227	175.83	226.1		1	267	146.55	225.1	12	2	311	116.62	223.8	12	0
228	175.07	225.8	12	2	268	145.82	224.8	12	2	313	115.14	223.7	12	0
229	174.31	225.7	12	2	269	145.06	224.8	12	2	314	114.38	223.7	12	0
230	173.53	225.5	12	2	270	144.50	224.9	12	2	315	113.63	223.9	12	2
231	172.81	225.5		1	271	144.19	224.9	12	2	316	112.88	224.3	12	0
232	172.06	225.8	12	0	273	143.70	225.0	12	1	317	112.13	224.6		10
233	171.63	225.8		1	274	142.59	225.0	12	0	318	111.65	224.6	12	0
234	171.17	225.9	12	0	275	142.06	225.0	12	4	319	111.10	224.8	12	0
235	170.63	225.9	12	2	276	141.31	224.8	12	2	320	110.59	224.7	12	0
236	169.86	226.0	12	2	277	140.56	224.7	12	2	321	109.87	224.9	12	0
237	169.08	225.7	12	0	279	139.09	223.9	12	0	322	109.10	225.0	12	0
238	168.31	225.7		3	280	138.35	224.0	12	0	323	108.43	225.1	12	0
239	167.80	225.8		2	281	137.48	224.1	12	2	324	107.62	225.1	12	0
240	166.88	225.9	12	2	282	136.80	224.0	12	2	325	106.87	225.3	12	0
241	166.10	225.8	12	2	283	135.87	224.0	12	2	326	106.11	225.3	12	0
242	165.16	226.0	12	2	284	135.25	224.0		4	328	104.63	225.1		10
243	164.54	225.7	12	0	285	134.96	224.0	21	2	329	103.88	225.1		1
244	163.77	225.6			286	134.57	224.0	21	2	330	103.14	225.3	12	0
245	163.10	225.6	12	0	287	133.82	224.0	21	0	331	102.35	225.5	12	0
246	162.29	225.5	12	0	288	133.07	223.8	21	0	332	101.63	225.7	12	0
247	161.45	225.5	12	2	289	132.36	223.8	21	0	333	100.91	225.7	12	0
248	160.72	225.5	12	2	290	131.58	224.0	21	2	335	99.40	225.0	12	0
249	160.08	225.5	12	0	291	130.87	224.0	21	2	336	98.62	224.7	12	0
250	159.45	225.4	12	0	292	130.32	224.1		3	337	97.87	224.5	12	0
251	158.52	225.4	12	0	293	129.80	223.9	21	0	338	97.11	224.3	12	0
252	157.72	225.4			294	129.33	223.7	21	0	339	96.37	224.3	12	0
253	157.00	225.4	12	2	295	128.59	223.7	21	2	340	95.62	224.3	12	0
254	156.21	225.4			296	127.86	223.6	12	0	341	94.85	224.4	12	0
255	155.52	225.3	12	2	297	127.10	223.7	12	2	342	94.04	224.1	12	0
256	154.73	225.2	12	2	298	126.37	223.6	12	0	343	93.37	223.9	12	0
257	154.04	225.2	12	2	299	125.63	223.6		1	345	91.87	223.7	12	0
258	153.23	225.1	12	2	300	124.87	223.5	12	0	346	91.12	223.5	12	0
259	152.55	225.2	12	2	302	123.41	223.5	12	2	347	90.42	223.2	12	0
260	152.04	225.2	12	2	303	122.60	223.8	12	2	348	89.65	223.1	12	0
261	151.34	225.2	12	2	304	121.86	223.8	12	0	349	88.88	223.0	12	0
262	150.23	225.2	12	2	305	121.19	223.7	12	2	350	88.49	223.0	12	0

PACE 1987

Shot Number 23 Shot Point 36

Shot Time (Julian day, hr, min, sec): 155:07:38:00.007

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
223	43.42	232.3	12	0	263	14.66	235.3	30	0	306	14.88	45.5	30	0
224	42.79	231.9	12	0	264	13.82	234.9	30	0	308	16.39	44.4	30	0
225	42.14	232.3	12	0	265	13.09	234.8	30	6	309	17.15	44.7	30	0
226	41.39	232.9	12	0	266	12.32	235.9	30	0	310	17.86	45.1	30	0
227	40.97	232.3		1	267	11.60	236.5	30	0	311	18.62	45.1	12	0
228	40.12	231.2	12	0	268	10.76	234.0	30	0	313	20.11	45.5	30	0
229	39.33	230.8	12	0	269	10.01	234.8	30	0	314	20.87	45.1	30	0
230	38.51	230.3	12	0	270	9.51	236.8	30	0	315	21.60	44.1	12	0
231	37.77	230.0		1	271	9.20	237.2	30	0	316	22.36	42.0	30	0
232	37.11	231.5	12	0	273	8.82	240.3	30	0	317	23.14	40.7		10
233	36.71	231.9		1	274	7.75	242.4	30	0	318	23.62	40.6	12	0
234	36.28	232.3	12	0	275	7.20	242.5	30	0	319	24.19	39.7	30	0
235	35.72	232.2	12	0	276	6.35	240.6	30	0	320	24.68	40.4	30	0
236	35.00	232.9	12	0	277	5.54	239.7	30	6	321	25.43	39.7	12	0
237	34.13	231.7	12	0	279	3.87	219.3	30	6	322	26.20	39.6	12	0
238	33.35	231.7		3	280	3.12	220.7	12	6	323	26.89	39.3	12	0
239	32.89	232.4		2	281	2.25	225.1	12	6	324	27.71	39.2	12	0
240	32.02	233.1	12	0	282	1.57	222.9	12	6	325	28.49	38.5	12	0
241	31.22	232.9	12	0	283	0.64	225.6		3	326	29.23	39.0	12	0
242	30.34	234.0	12	0	284	0.04	290.5		4	328	30.68	39.9		10
243	29.63	232.8	12	0	285	0.28	49.3	88	0	329	31.43	39.8		1
244	28.83	232.5		3	286	0.66	46.8	88	0	330	32.20	39.4	12	0
245	28.18	232.8	12	0	287	1.43	50.3	88	0	331	33.02	38.8	12	0
246	27.31	232.0	12	0	288	2.21	55.6	30	6	332	33.78	38.4	12	0
247	26.51	232.7	12	0	289	2.92	52.8	30	6	333	34.49	38.5	12	0
248	25.75	232.4	12	0	290	3.65	45.0	30	6	335	35.88	40.7	12	0
249	25.15	233.2	12	0	291	4.37	44.7	30	6	336	36.64	41.7	30	0
250	24.47	232.3	12	0	292	4.91	42.3		3	337	37.38	42.2	12	0
251	23.55	232.8	12	0	293	5.44	46.3	30	0	338	38.13	42.6	12	0
252	22.78	233.3		1	294	5.95	50.0	30	0	339	38.87	42.7	30	0
253	22.06	233.5	12	0	295	6.69	50.1	30	0	340	39.62	42.7	12	0
254	21.28	233.8		4	296	7.43	50.3	30	0	341	40.39	42.6	12	0
255	20.52	232.8	30	0	297	8.16	48.1	30	0	342	41.19	43.3	12	0
256	19.71	232.6	12	0	298	8.91	49.0	30	0	343	41.87	43.8	12	0
257	19.04	232.9	30	0	299	9.65	48.8		1	345	43.37	44.1	12	0
258	18.21	232.8	30	0	300	10.43	49.7	30	0	346	44.12	44.6	12	0
259	17.56	233.5	30	0	302	11.87	48.5	30	0	347	44.84	45.0	12	0
260	17.07	234.2	12	0	303	12.64	45.9	12	0	348	45.61	45.3	12	0
261	16.39	234.6	12	2	304	13.38	45.5	30	0	349	46.39	45.4	12	0
262	15.27	234.8	30	0	305	14.06	46.0	30	0	350	46.78	45.4	12	0

PACE 1987

Shot Number 24 Shot Point 7

Shot Time (Julian day, hr, min, sec): 155:10:00:00.010

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
			Db	Grade				Db	Grade				Db	Grade
223	54.32	148.6	12	0	263	57.72	119.0	12	0	306	73.58	97.1	12	0
224	54.52	147.9	12	0	264	58.19	118.3	12	0	308	74.28	96.0	12	0
225	54.20	147.2	12	0	265	58.52	117.7	12	0	309	74.82	95.6	12	0
226	53.67	146.5	12	0	266	58.68	116.9	12	0	310	75.35	95.2	12	0
227	54.10	146.0		1	267	58.91	116.2	12	4	311	75.85	94.8	12	0
228	54.76	145.1		4	268	59.75	115.7	88	9	313	76.91	94.0	12	0
229	55.03	144.2	12	0	269	59.97	115.0		0	314	77.30	93.5	12	0
230	55.32	143.3	12	0	270	59.94	114.5	12	0	315	77.50	92.9	12	0
231	55.46	142.6		1	271	60.04	114.2	12	0	316	77.36	92.1	12	0
232	54.46	141.9	12	0	273	59.87	113.6	12	0	317	77.46	91.4		10
233	54.20	141.5		1	274	60.28	112.6	12	0	318	77.74	91.1	12	0
234	53.95	141.0	12	0	275	60.62	112.2	12	0	319	77.83	90.6	12	0
235	54.02	140.4	12	0	276	61.33	111.7	12	0	320	78.36	90.5	12	0
236	53.60	139.7	12	0	277	61.91	111.2	12	0	321	78.59	89.9	12	0
237	54.36	138.8	12	0	279	64.15	110.6	12	0	322	79.03	89.5	12	0
238	54.44	138.0		3	280	64.32	110.0	12	0	323	79.39	89.0	12	0
239	54.05	137.4		2	281	64.47	109.2	12	0	324	79.87	88.5	12	0
240	53.71	136.5	12	0	282	64.82	108.6	12	0	325	80.12	88.0	12	0
241	53.93	135.6	12	0	283	65.17	107.9	12	0	326	80.78	87.7	12	0
242	53.46	134.6	12	0	284	65.43	107.4		4	328	82.09	87.1		10
243	54.21	134.0	12	2	285	65.61	107.2	21	0	329	82.56	86.7		1
244	54.49	133.2		3	286	65.79	106.9	21	0	330	82.94	86.2	12	0
245	54.41	132.5	12	0	287	66.25	106.4	21	0	331	83.24	85.7	12	0
246	54.98	131.7	12	0	288	66.85	105.9	21	0	332	83.58	85.2	12	0
247	54.80	130.8	12	0	289	67.18	105.4	21	0	333	84.12	84.8	12	0
248	55.06	130.0	12	0	290	67.22	104.6		4	335	86.06	84.8	12	0
249	54.88	129.3	12	0	291	67.56	104.1	21	0	336	87.01	84.7	12	0
250	55.38	128.7	12	0	292	67.66	103.6		3	337	87.80	84.6	12	0
251	55.43	127.8	12	0	293	68.24	103.4	21	0	338	88.54	84.4	12	0
252	55.43	126.9		1	294	68.83	103.2	21	0	339	89.11	84.1	12	0
253	55.56	126.2	12	0	295	69.28	102.7	21	0	340	89.67	83.8	12	0
254	55.68	125.4		4	296	69.75	102.2	12	0	341	90.19	83.4	12	0
255	56.27	124.8	12	0	297	69.95	101.6	12	0	342	91.15	83.3	12	0
256	56.57	124.0		3	298	70.50	101.2	12	0	343	91.90	83.2	12	0
257	56.68	123.3	12	0	299	70.92	100.7		1	345	93.19	82.7	12	0
258	57.02	122.6	12	0	300	71.53	100.3	12	0	346	94.02	82.6	12	0
259	57.02	121.9	12	0	302	72.26	99.3	12	0	347	94.79	82.5	12	0
260	57.00	121.3	12	0	303	72.29	98.5	12	0	348	95.53	82.3	12	0
261	57.17	120.7	12	0	304	72.66	98.0	12	0	349	96.18	82.1	12	0
262	57.58	119.6	12	0	305	73.18	97.6	12	0	350	96.50	81.9	12	0

PACE 1987

Shot Number 25 Shot Point 23

Shot Time (Julian day, hr, min, sec): 155:10:01:59.955

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
223	48.30	43.9	12	0	263	76.98	46.3	12	0	306	106.37	47.3	12	0
224	48.89	44.4	12	0	264	77.79	46.5	12	0	308	107.87	47.1	12	0
225	49.57	44.2	12	0	265	78.52	46.6	30	0	309	108.63	47.2	12	0
226	50.37	43.8	12	0	266	79.31	46.5	12	0	310	109.34	47.2	12	0
227	50.73	44.3		1	267	80.05	46.5		4	311	110.10	47.2	12	0
228	51.49	45.3		4	268	80.81	46.9		4	313	111.59	47.2	12	0
229	52.25	45.7	12	0	269	81.57	46.9	12	0	314	112.34	47.1	12	0
230	53.04	46.1	12	0	270	82.11	46.7	12	0	315	113.06	46.9	12	0
231	53.76	46.4		1	271	82.43	46.7	12	0	316	113.75	46.5	12	0
232	54.50	45.4	12	0	273	82.90	46.4	12	0	317	114.48	46.2		10
233	54.93	45.2		1	274	84.01	46.4	12	0	318	114.96	46.2	12	0
234	55.38	45.0	12	0	275	84.55	46.5	12	0	319	115.49	46.0	30	0
235	55.93	45.1	12	0	276	85.32	46.8	12	0	320	116.01	46.1	12	0
236	56.70	44.7	12	0	277	86.08	47.0	12	0	321	116.71	45.9	12	0
237	57.48	45.5	12	0	279	87.68	48.1	30	0	322	117.48	45.8	12	0
238	58.25	45.7		3	280	88.40	48.0	12	0	323	118.14	45.7	12	0
239	58.75	45.3		2	281	89.25	47.8	30	0	324	118.95	45.6	12	0
240	59.67	45.0	12	0	282	89.94	47.8	12	0	325	119.69	45.4	12	0
241	60.45	45.2	12	0	283	90.86	47.7	12	0	326	120.45	45.5	12	0
242	61.40	44.8	12	0	284	91.48	47.7		4	328	121.95	45.6		10
243	62.02	45.5	12	2	285	91.78	47.7	21	0	329	122.69	45.6		1
244	62.79	45.7		3	286	92.16	47.7	21	0	330	123.43	45.4	12	0
245	63.46	45.6	12	0	287	92.93	47.7	21	0	331	124.20	45.2	12	0
246	64.28	46.1	12	0	288	93.70	47.9	21	0	332	124.93	45.1	12	0
247	65.11	45.8	12	0	289	94.41	47.8	21	0	333	125.64	45.1	12	0
248	65.85	46.0	12	0	290	95.15	47.6		4	335	127.17	45.6	12	0
249	66.48	45.8	12	0	291	95.86	47.5	21	0	336	127.97	45.9	12	0
250	67.12	46.2	12	0	292	96.39	47.4		3	337	128.74	46.0	12	0
251	68.06	46.1	12	0	293	96.94	47.6	21	0	338	129.51	46.1	12	0
252	68.85	46.0		1	294	97.45	47.8	21	0	339	130.25	46.1	30	0
253	69.57	46.0	12	0	295	98.19	47.8	21	0	340	131.00	46.1	12	0
254	70.36	46.0		4	296	98.93	47.9	12	0	341	131.76	46.0	12	0
255	71.07	46.3	12	0	297	99.66	47.7	12	0	342	132.59	46.2	12	0
256	71.86	46.5	12	0	298	100.41	47.8	12	0	343	133.29	46.3	12	0
257	72.55	46.4	12	0	299	101.15	47.8		1	345	134.80	46.4	12	0
258	73.37	46.5	12	0	300	101.93	47.9	30	0	346	135.57	46.6	12	0
259	74.04	46.4	12	0	302	103.37	47.7	12	0	347	136.29	46.7	12	0
260	74.55	46.3	12	0	303	104.13	47.4	12	0	348	137.08	46.8	12	0
261	75.24	46.3	12	2	304	104.87	47.4	12	0	349	137.86	46.8	12	0
262	76.36	46.4	12	0	305	105.55	47.4	12	0	350	138.24	46.8	12	0

PACE 1987

Shot Number 26 Shot Point 32

Shot Time (Julian day, hr, min, sec): 155:10:04:00.010

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
---	---	---	Db	Grade	---	---	---	Db	Grade	---	---	---	Db	Grade
223	129.05	226.1	12	0	263	100.40	224.7	12	0	306	71.20	222.2	12	0
224	128.45	226.0	12	0	264	99.60	224.5	12	0	308	69.67	222.4	12	0
225	127.78	226.0	12	0	265	98.88	224.5	12	0	309	68.92	222.3	12	0
226	126.99	226.2	12	0	266	98.08	224.5	12	0	310	68.22	222.1	12	0
227	126.62	226.0		1	267	97.34	224.5		4	311	67.46	222.1	12	0
228	125.85	225.6		4	268	96.62	224.1		4	313	65.98	221.9	12	0
229	125.10	225.4	12	0	269	95.86	224.1	12	0	314	65.22	222.0	12	0
230	124.32	225.2	12	0	270	95.30	224.2	12	0	315	64.47	222.3	12	0
231	123.60	225.1		1	271	94.98	224.2	12	0	316	63.70	223.0	30	0
232	122.85	225.5	12	0	273	94.49	224.5	12	0	317	62.93	223.5		10
233	122.42	225.6		1	274	93.38	224.4	12	0	318	62.46	223.5	12	0
234	121.96	225.7	12	0	275	92.85	224.3	12	0	319	61.90	223.9	30	0
235	121.41	225.7	12	0	276	92.11	224.1	12	0	320	61.40	223.6	12	0
236	120.65	225.8	12	0	277	91.36	223.9	12	0	321	60.67	224.0	12	0
237	119.87	225.5	12	0	279	89.92	222.7	12	0	322	59.90	224.1	12	0
238	119.10	225.4		3	280	89.18	222.8	12	0	323	59.23	224.2	12	0
239	118.59	225.6		2	281	88.31	222.9	12	0	324	58.41	224.4	12	0
240	117.67	225.7	12	0	282	87.62	222.8	12	0	325	57.66	224.8	12	0
241	116.89	225.6	12	0	283	86.70	222.9	12	0	326	56.90	224.6	12	0
242	115.94	225.8	12	0	284	86.07	222.9		4	328	55.42	224.3		10
243	115.33	225.5	12	2	285	85.78	222.8	21	0	329	54.68	224.4		1
244	114.55	225.3		3	286	85.39	222.8	21	0	330	53.93	224.6	12	0
245	113.89	225.4	12	0	287	84.64	222.7	21	0	331	53.14	225.1	12	0
246	113.08	225.1	12	0	288	83.90	222.5	21	0	332	52.42	225.4	12	0
247	112.24	225.2	12	0	289	83.19	222.5	21	0	333	51.70	225.4	12	0
248	111.51	225.1	12	0	290	82.41	222.7		4	335	50.20	224.1	30	0
249	110.87	225.2	12	0	291	81.69	222.7	21	0	336	49.42	223.4	30	0
250	110.24	225.0	12	0	292	81.14	222.8		3	337	48.68	223.0	30	0
251	109.31	225.0	12	0	293	80.63	222.6	30	0	338	47.93	222.7	30	0
252	108.51	225.1		1	294	80.16	222.3	21	0	339	47.19	222.7	30	0
253	107.79	225.1	12	0	295	79.43	222.2	21	0	340	46.44	222.6	30	0
254	107.00	225.1		4	296	78.70	222.1	12	0	341	45.66	222.7	12	0
255	106.31	224.8	12	0	297	77.94	222.2	12	0	342	44.87	222.0	12	0
256	105.52	224.7	12	0	298	77.21	222.1	12	0	343	44.21	221.5	12	0
257	104.84	224.7	12	0	299	76.47	222.0		1	345	42.72	221.2	12	0
258	104.02	224.6	12	0	300	75.72	221.8	12	0	346	41.99	220.6	12	0
259	103.34	224.7	12	0	302	74.26	221.9	12	0	347	41.31	220.0	12	0
260	102.83	224.8	12	0	303	73.44	222.2	12	0	348	40.56	219.7	30	0
261	102.14	224.8	12	0	304	72.70	222.3	12	0	349	39.79	219.5	12	0
262	101.03	224.7	12	0	305	72.03	222.1	12	0	350	39.41	219.4	12	0

PACE 1987

Shot Number 27 Shot Point 28

Shot Time (Julian day, hr, min, sec): 155:10:06:00.007

Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape		Loc	Dist (km)	Azim (deg)	Tape	
			Db	Grade				Db	Grade				Db	Grade
223	33.97	231.0	12	0	263	5.18	232.8	30	0	306	24.25	49.8	12	0
224	33.35	230.5	12	0	264	4.36	230.9	30	0	308	25.74	48.9	12	0
225	32.69	230.9	12	0	265	3.63	229.9	30	0	309	26.50	48.9	12	0
226	31.94	231.7	12	0	266	2.84	233.2	30	6	310	27.21	49.1	12	0
227	31.53	230.9		1	267	2.12	235.9		4	311	27.97	49.0	12	0
228	30.69	229.5		4	268	1.36	215.0		4	313	29.47	49.0	12	0
229	29.92	228.9	12	0	269	0.62	205.1	88	0	314	30.21	48.7	12	0
230	29.11	228.1	12	0	270	0.04	266.1	88	0	315	30.92	47.9	12	0
231	28.38	227.7		1	271	0.29	38.9	30	6	316	31.62	46.3	12	0
232	27.68	229.7	12	0	273	0.87	17.4	12	6	317	32.36	45.3		10
233	27.27	230.2		1	274	1.93	33.1	30	6	318	32.83	45.1	12	0
234	26.83	230.7	12	0	275	2.43	39.2	30	6	319	33.38	44.4	12	0
235	26.28	230.5	12	0	276	3.18	48.7	12	6	320	33.89	44.9	12	0
236	25.55	231.5	12	0	277	3.96	52.4	12	6	321	34.61	44.2	12	0
237	24.70	229.8	12	0	279	5.90	67.9	30	0	322	35.37	44.0	12	0
238	23.92	229.6		3	280	6.54	64.2	30	0	323	36.05	43.8	12	0
239	23.45	230.6		2	281	7.29	60.2	30	0	324	36.86	43.6	12	0
240	22.57	231.6	12	0	282	7.97	59.3	30	0	325	37.62	43.0	12	2
241	21.77	231.2	12	0	283	8.85	57.4	30	0	326	38.37	43.2	12	0
242	20.88	232.8	12	0	284	9.46	56.4		4	328	39.85	43.8		10
243	20.18	230.9	12	2	285	9.75	56.4	30	0	329	40.60	43.6		1
244	19.38	230.3		3	286	10.13	56.0	30	0	330	41.35	43.3	12	0
245	18.73	230.8	12	0	287	10.90	55.8	21	0	331	42.14	42.7	12	0
246	17.88	229.4	12	0	288	11.69	56.4	21	0	332	42.88	42.3	12	0
247	17.06	230.4	12	0	289	12.39	55.7	21	0	333	43.60	42.4	12	0
248	16.31	229.9	12	0	290	13.08	53.4		4	335	45.08	44.0	12	0
249	15.70	231.0	12	0	291	13.78	52.9	21	0	336	45.86	44.7	12	0
250	15.03	229.6	12	0	292	14.29	51.7		3	337	46.62	45.1	12	0
251	14.10	230.1	30	0	293	14.86	52.9	21	0	338	47.38	45.4	12	0
252	13.32	230.8		1	294	15.40	54.1	21	0	339	48.12	45.4	12	0
253	12.60	231.1	30	0	295	16.15	53.9	21	0	340	48.87	45.3	12	0
254	11.82	231.4		4	296	16.89	53.8	12	0	341	49.64	45.2	12	0
255	11.08	229.4	30	0	297	17.59	52.7	12	0	342	50.46	45.8	12	0
256	10.28	228.8	12	2	298	18.35	52.9	12	6	343	51.15	46.1	12	2
257	9.60	229.2	30	0	299	19.08	52.7		1	345	52.66	46.3	12	0
258	8.78	228.5	30	0	300	19.87	53.0	12	0	346	53.43	46.7	12	0
259	8.11	229.8	30	0	302	21.30	52.1	12	0	347	54.16	47.0	12	0
260	7.61	231.1	30	0	303	22.03	50.5	12	0	348	54.94	47.2	12	0
261	6.92	231.7	12	0	304	22.76	50.1	12	0	349	55.72	47.2	12	0
262	5.80	231.7	30	0	305	23.44	50.3	12	0	350	56.11	47.2	12	0

APPENDIX D

Archive Tape Data Format

Archive data tapes are written in SEG Y standard format (Barry and others, 1975). Recording density is 1600 bpi, phase encoded (PE). In order to accommodate seismic refraction data, some minor changes have been made to the tape header fields. A complete list of header fields is provided in the card image portion of the reel identification header, shown below:

C 1 REEL IDENTIFICATION HEADER BYTES:
 C 2 3217-3218 sampling interval (microsecs)
 C 3 3221-3222 number of samples per trace
 C 4 3225-3226 data sample format code
 C 5 3255-3256 measurement system (1 = meters; 2 = feet)
 C 6
 C 7
 C 8 TRACE IDENTIFICATION HEADER BYTES:
 C 9 1 - 4 trace sequence number within reel
 C10 5 - 8 trace sequence number within reel
 C11 9 - 12 station location number
 C12 29 - 30 trace ID code (1 = seismic data)
 C13 37 - 40 shotpoint-receiver distance (M)
 C14 41 - 44 station elevation (M)
 C15 45 - 48 shotpoint elevation (M)
 C16 49 - 52 source depth (M)
 C17 69 - 70 scalar to be applied to all elevations
 C18 71 - 72 scalar to be applied to all coordinates
 C19 73 - 76 shotpoint coordinate, X
 C20 77 - 80 shotpoint coordinate, Y
 C21 81 - 84 receiver coordinate, X
 C22 85 - 88 receiver coordinate, Y
 C23 89 - 90 coordinate units (1 = meters; 2 = seconds of arc)
 C24 115 - 116 number of samples in this trace
 C25 117 - 118 sample interval in microseconds for this trace
 C26 121 - 122 instrument attenuation in db
 C27 157 - 158 shot time - year
 C28 159 - 160 shot time - day of year
 C29 161 - 162 shot time - hour of day (24 hour clock)
 C30 163 - 164 shot time - minute of hour
 C31 165 - 166 shot time - second of minute
 C32 167 - 168 time basis code (2 = GMT)
 C33 181 - 182 shot time milliseconds
 C34 183 - 184 shotpoint location number
 C35 185 - 186 recording instrument unit number
 C36 191 - 192 distance weighting exponent (hundredths)
 C37 193 - 194 shot sequence number (shot number)
 C38 195 - 196 shot size (kg)
 C39 197 - 200 shot point - station azimuth (seconds of arc)
 C40 201 - 204 time of first point minus shot time (msec)

The data point is "32 bit floating point", and the appropriate bytes (3225-3226) of the binary reel id header contain a value of 1. The trace amplitudes have not been adjusted for instrument gain, but the gain correction factor can be estimated from the instrument attenuation value (att) specified in bytes 121-122. To correct for gain, the data should be demeaned and then multiplied by:

$$10^{(att/20)}$$

The measurement system (bytes 3255-3256 of the binary reel header) is set to 1, meters.

Shotpoint an receiver coordinates are in seconds of arc (byte field 89-90). The coordinate scalar multiplier (bytes 71-72) is set to -100, so the coordinates (bytes 73-88) are in hundredths of a second of arc.

Bytes 157-166 and bytes 181-182 refer to the shot detonation time. The time of the first data sample is found by adding the shot detonation time to the time specified in bytes 201-204.

Since there is no weighting of amplitudes with distance for archive tapes, the distance weighting exponent (bytes 191-192) is not used.

Shot sequence number (bytes 193-194) refers to the order in which shots were fired during the field campaign.

APPENDIX E

True Amplitude Plotting Parameters

Below is a list of the plotting parameters used to produce the true amplitude record sections in this report. Refer to the Data Reduction section of this report for a description of these parameters and their use. Two exponents (r_1 and r_2) are required by the record section plotting routine (Luetgert, in prep.) The first exponent controls the attenuation of traces before the cross-over distance (d_c), while the second controls the gain of traces beyond the cross-over distance. The efficiency factor (f_s) is the specified amplitude at the cross-over distance, and is a scalar applied for cosmetic purposes only.

Shot	Shotpoint	d_c	r_1	r_2	f_s
1	37	15	1.275	1.275	0.0025
2	34	15	1.7	1.7	0.003
3	31	15	1.05	1.05	0.0011
4	20	15	1.3	1.3	0.006
5	26	10	1.1	1.1	0.0025
6	33	15	1.0	1.0	0.012
7	22	15	1.7	1.7	0.0075
8	21	10	1.1	1.1	0.004
9	24	10	1.65	1.65	0.006
10	25	10	1.55	1.55	0.0055
11	23	10	1.9	1.9	0.02
12	28	10	1.2	1.2	0.0045
13	35	10	1.85	1.85	0.0085
14	27	10	1.5	1.5	0.005
15	20	15	1.12	1.12	0.001
16	31	15	1.3	1.3	0.004
17	34	10	1.3	1.3	0.003
18	29	10	1.25	1.25	0.002
19	26	10	1.1	1.1	0.0025
20	21	10	1.0	1.0	0.002
21	30	10	1.45	1.45	0.004
22	33	15	1.6	1.6	0.004
23	36	15	1.8	1.8	0.006
24	7	10	1.25	1.25	0.003
25	23	10	1.1	1.1	0.0035
26	32	15	1.3	1.3	0.003
27	28	10	1.5	1.5	0.01